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1970 British Cohort Study

Ten-year Special Needs Survey

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User guide to the data (First Edition)

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The Centre for Longitudinal Studies (CLS) is an ESRC Resource Centre based at the Institution of Education. It provides support and facilities for those using the three internationally-renowned birth cohort studies: the National Child Development Study (1958), the 1970 British Cohort Study and the Millennium Cohort Study (2000). CLS conducts research using the birth cohort study data, with a special interest in family life and parenting, family economics, youth life course transitions and basic skills. The views expressed in this work are those of the author(s) (amend as necessary) and do not necessarily reflect the views of the Economic and Social Research Council. All errors and omissions remain those of the author(s).

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Table of Contents

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1. Introduction

This document provides a brief guide to the data deriving from the Special Needs Tests administered to 456 selected subjects of the 1970 British Cohort Study (BCS70) in 1980 when they were 10 years of age. The data supplement those already available from the Economic and Social Data Service (http://www.esds.ac.uk), who facilitate access and support for the UK Data Archive (http://www.data-archive.ac.uk) for other elements of the 1980 survey. A summary of the deposited data is given below and in further detail in Appendix 1. Before using these data you are strongly advised to consult the main documentation for the 1980 survey and that for BCS70 as a whole available via ESDS and from the CLS website (http://www.cls.ioe.ac.uk).

Data file name	Instrument	Test
Age 10 (Repeat) Tests	CHES Friendly Maths Test	Friendly Maths Test
	Shortened Ed Reading test	Edinburgh Reading Test
	British Ability Scales	BAS Word Definitions
		BAS Recall of Digits
		BAS Similarities
		BAS Matrices
	Instruction Booklet for Educational Tests	Dictation
		Copying
		Months Fwd/Backwd
	Educational Score From	Social Judgement
	[Derived variables]	Derived Test Score Variables
Special Tests	Special Test Booklet	Fundamental Concepts Test
		Copying Designs Test
		Human Figure Drawing Test
		Further Information on child's capabilities
		Young's Group Mathematics Test
		Thackray Reading Readiness Profiles
	Special Teacher Questionnaire	

1.1 1970 British Cohort Study

BCS70 is a continuing, national longitudinal study which began when data were collected about the births of 17,198 babies in England, Scotland, Wales and Northern Ireland in one week in April 1970. Since the birth survey there have been seven other major data collection exercises designed to monitor the health, education, social and economic circumstances of the members of this birth cohort living in GB (England, Scotland and Wales). These were carried out in 1975 (age 5), 1980 (age 10), 1986 (age 16), 1996 (age 26), 2000 (age 30), 2004 (at age 34) and 2008 (at age 38). Sub-samples have also been studied at various ages: for example at age 21, a survey of 10 per cent representative sample focused on basic skills difficulties.

From its original focus on the circumstances and outcomes of birth, BCS70 has broadened in scope to map all aspects of health, education and social development of their subjects as they passed through childhood and adolescence. In later sweeps, the information collected has covered their transitions into adult life, including leaving full-time education, entering the labour market, setting up independent homes, forming partnerships and becoming parents.

1.2 BCS70 1980 Follow-up

The 1980 follow-up, like its 5-year predecessor, was originally titled the Child Health and Education Study (CHES). But in 1991 the whole project was renamed the 1970 British Cohort Study (BCS70) and the ten-year sweep became known as the BCS70 Ten-year Follow-up.

This sweep made use of fifteen separate survey documents, comprising manuals, assessments, self-completion questionnaires, interview schedules, and a medical examination record. These documents are reproduced and explained in the Guide to the BCS70 10-year Dataset, which can be downloaded from the CLS website (http://www.cls.ioe.ac.uk/bcs70).

Most of the data gathered during this survey are already available from the UK Data Archive via ESDS (http://www.esds.ac.uk). The data which were not previously deposited related to the contents of one of the survey elements - the *Special Educational Pack*.

2. Special Educational Pack

2.1 Introduction

Underlying the development of educational instruments was an awareness of the special needs of the child suffering from certain forms of disability, whether this be educational, mental, physical or behavioural. Clearly this had to be a key focus of attention within the overall ambit of surveying the entire cohort. This made the task of selecting the instruments particularly exacting. There was a need to introduce sub-scales within the instruments that would yield more interesting and meaningful information than could be obtained from simpler tests (with conceptually homogeneous scales of items).

This assessment of the educational attainment of children with disabilities posed many problems because of the heterogeneity of the disabilities. Presentation of the tests had to be modified in the case of partially sighted and blind children, for children with severe hearing loss, and those children identified as having severe motor/locomotor disabilities, many of whom had accompanying severe hand-eye co-ordination problems.

As expected, children with severe or moderately severe learning disabilities (formerly ESN(S) and most ESN(M) children) were unable to attempt most of the tests carried out on the main cohort and needed a set of tests more tailored to their range of capabilities. The assessment of the educational attainment of such children was given much thought and a variety of special instruments were developed or adapted, which became the elements of the Special Educational Pack.

One particular concern on the educational side of the BCS70 Ten-year Follow-up was to gather information on educational attainment on children who were unlikely to be able to complete the educational attainment tests administered at ten years. Teachers were given the option of electing to ask for a Special Educational Pack with easier tests for any child for whom they considered the standard testing too hard.

The other criteria for selecting children for the receipt of Special Educational Packs included children who had completed the ordinary pack but had scored in the bottom 5 per cent on the *Edinburgh Reading Test* and/or the *Friendly Maths Test.* All children receiving Special Educational Treatment (SET) were also sent a Special Educational Pack.

Each Special Educational Pack contained the standard educational test material which teachers were asked to try with the child in order to know where the child fitted within the lower end of the distributions of the standard pack test scores.

Survey instrumentation for the 1980 follow-up was distributed through education and health authorities. The Special Needs Tests were included in the materials distributed through Local Education Authorities and, where parental consent was obtained, administered to cohort members in school with the assistance of teachers.

2.2 Contents of the Special Educational Pack

The packs consisted of:

Instruction Booklet

a) an *Instruction Booklet* for Special Educational Tests

Special Educational Tests:

b) a *Special Test Booklet* for the teacher to administer at school, which combined tests of conservation, matching classification and seriation (*Fundamental Concepts Test*), together with a *Copying Designs Test* and the *Human Figure Drawing Test* (Harris, 1963). Both these latter tests had been used in the five-year follow-up.

c) three polythene bags labeled 1, 2 and 3. Bag 1 contained red and blue counters. Bag 2 contained strips of white card of different lengths. Bag 3 contained two balls of plasticine.

d) the *Young's Group Mathematics Test* (1980)

e) the *Thackray Reading Readiness Profiles* (1974) of which the *visual discrimination* and *auditory discrimination* tests were used

Ordinary Test material:

f) Shortened Edinburgh Reading Test (ERT)

g) CHES Pictorial Language Comprehension Test (PLCT)

h) British Ability Scales (BAS)

i) CHES Friendly Maths Test (FMT)

j) Educational Score Form

k) Pupil Question Form (not given to ESN (S) children or those who attempted it in main 1980 survey – see Instruction Booklet)

l) Educational Questionnaire

Other Material:

m) A Report Form for reporting whether the child completed the tests, and any difficulties he/she experienced.

n) A Special Teacher Questionnaire, containing check lists for completion by the teacher on the children's vision, hearing, manual dexterity and discrimination. This questionnaire also asked teachers to describe the study child and contained questions on the provision of remedial services. It was aimed in this way to collect some educational attainment information on every child in the survey, no matter how severe their educational difficulties appeared to be.

The instructions were to apply the special educational tests first, if necessary over three sessions (see *Instruction Booklet*). Then the Ordinary Test Material should be applied, so as to form a comprehensive assessment of the child's abilities. It was anticipated that many of the special needs children would be unable to complete these ordinary tests, but should be given the chance to proceed as far as they were able.

The *Special Education Pack* testing took place between February and July, 1981. Directors of LEAs, Principal Educational Psychologists and LEA Study Co-ordinators were kept informed that the special testing was taking place. *Special Educational Packs* were dispatched directly to the appropriate school(s). A total of 456 *Special Educational Packs* were completed and returned.

It should be noted that 29 of the 456 children contacted in this exercise were not present in the main BCS70 age 10 survey. The remaining 427 children had the opportunity to re-try all the tests in the 'Ordinary Test Material' (ERT, PLCT etc.) which they had already completed in the main survey (although not all did attempt them – see Appendix 1, first paragraph).

3. Why were the Special Needs data deposited so much later than the rest of the BCS70 10-year data?

The administration of the BCS70 cohort study was taken over by the Centre for Longitudinal Studies (formerly the Social Statistics Research Unit, City University) in 1991. It had previously been housed at the International Centre for Child Studies based in Bristol, and before this at the University of Bristol.

Following the transfer of the CHES and other BCS70 data from the University of Bristol, it was found that the data for the sweeps up to and including age 16 were not stored and documented in a systematic way, and certain elements appeared to be missing.

One such element was a series of five datasets containing the results of the special needs tests at age 10, administered to 456 children (3% of the full BCS70 population). The datasets did not come to light until an exercise to clear archived files off the historic mainframe servers, into a Windows environment.

The contents of the five data files are summarised in the table in Appendix 1. Note that these five files have been combined into one consolidated dataset for the purposes of this deposit.

The first four data files held the answers to the instruments making up the Ordinary Test Material (see Section B): the ERT, PLCT, BAS, FMT; the educational score form; the pupil question form; and the educational questionnaire.

The fifth data file contained the results of the special educational tests designed specifically for children with special needs, plus questions asked to their teachers. As such, this data file is the most significant addition to the data previously deposited.

Although the variables in these five datasets were not labelled in a thorough way, the significance of most of the variables was discernible, since those in the first four files were in a similar order and/or had similar names to those in the main BCS70 10-year dataset.

However, the fifth (and in many ways most interesting) data file contained no variable labels and no value labels for any of its 500 variables. So a great deal of 'cleaning' work had to be done, to deduce the meaning of the variables and label them properly. In some cases, this involved extracting copies of the original paper questionnaires from the study archives, to confirm that the variables in the dataset did indeed correspond to the results of the respective written tests (see list below).

The Special Needs Tests were included in the *Student Test Booklet.* The cohort members recorded their answers on a machine-readable *Student Score Form*. See Appendix 2 for a summary of the contents of these.

Specimen copies of the Special Test Booklet and Special Teacher Questionnaire, annotated with variable names, are available in Appendix 6. The Instruction Booklet for Children Taking Special Educational Tests is in Appendix 8.

NB: It should be noted that the values of a small number of variables could not be interpreted reliably enough for their values to be labelled for research use. Accordingly, twenty of the original 1,575 were not deposited. However, it may be possible at a future date to re-key the question responses to which these relate, from scanned copies of the original questionnaires. The variables in question (whose names still appear on the annotated questionnaires accompanying this deposit) are: i1904 i1905 i1906 i1907 i1908 i5073 i5074 i5077 i5078 i5081 i5082 i5457 i5458 i5459 i5460 i5461 i5462 i5463 i5464 and i5465.

4. Introduction to the tests and guidance on interpreting results

4.1 Introduction

Before designing the instruments in 1980, both for the Special Educational Tests and the Ordinary Test Material, a preliminary study of the available assessment instruments was undertaken, which showed that the great majority had been constructed many years previously: in some cases publishers suggested instruments which had been created in the 1950s or '60s. In the situation where a considerable investment of government and institutional funds was being made to enable the CHES survey to be undertaken, it did not seem desirable to adhere to tests and measures which were no longer wholly appropriate to the British educational and psychological environment at the start of 1980.

Examination of individual instruments and discussions with educational specialists and psychologists in different fields of interest indicated widespread dissatisfaction with many of these older instruments. In cases where instruments were regarded as suitable, the limited age range of some of them suggested that both ceiling and floor effects would operate to reduce the number within the cohort who would attain usable scores. It was therefore decided to embark on a wide-ranging series of discussions within each field to bring to light the latest thinking and then to approach specialists in these fields to prepare the necessary tests.

The goal was the creation of a set of educational tests which would take about 2 1/2 hours to complete within the suggested two or three testing sessions; and a comprehensive educational questionnaire which would take 1 - 1 1/2 hours for completion by the school head and the child's class teacher.

See Appendix 3 for more details about the development of the main tests in the Ordinary Test Material (ERT, PLCT, FMT), and diagnostic grids.

4.2 Special Educational Tests

Fundamental Concepts Test

Regrettably, no guidance could be found on the interpretation of this test. Having made extensive enquiries among those academics who collaborated in the design and conduct of the 1980 survey, it appears the test was devised by Professor Neville Butler, who sadly died in February 2007 without apparently leaving any documentation on how it might be scored.

The test appears to have been designed with some care and attention to tease out what sort of factors are driving the low performance of these 456 children, who tended to be in the bottom 5% of the results for the Ordinary Test Material. Such factors might include difficulty in differentiating or comparing the shape of objects, or their size or colour, or in judging relative length or volume, as well as the more obvious problems such as partial-sightedness, deafness, dyslexia and poor counting ability.

We recognise that it is somewhat unsatisfactory to be making the data for this test available without guidance, but felt that this resource might still be useful to researchers who were enterprising enough to devise a method of scoring which might gain acceptance under peer review.

Copying Designs Test

Previous studies (Davie et al, 1972; Rutter et al, 1970; Osborn et al, 1984) have tested children's ability to copy designs as a means of assessing their visual-motor co-ordination. For this survey children were asked to make two copies of each of eight designs (see Appendix 4).

Human Figure Drawing Test

This was a modified version of the Draw-a-Man test originally devised by Florence Goodenough (1926) and later developed by Dale Harris (1963). The Harris-Goodenough test has been subjected to extensive evaluation as a measure of IQ and correlations with conventional IQ tests (Binet, Weschler, etc) averaging .4 and .5 have been reported (Scott, 1981) Harris himself suggested that the test is more indicative of 'conceptual maturity' than IQ (op cit, p. 5).This shift in emphasis gets away from the notion of unitary intelligence, and permits consideration of children's concepts of the human figure as an index or sample of their concepts generally. See Appendix 5 for more detail.

Thackray Reading Readiness Profiles

The Thackray Reading Readiness Profiles were the first original British reading readiness tests to be published and were the outcome of ten years of research in the field of reading readiness with British children. The profiles consist of three group measures and one individual measure, including vocabulary and concept development, auditory discrimination, visual discrimination, and general ability. The profiles are designed to be administered in the reception class soon after children start school for the first time.

The Manual (Thackray and Thackray, 1974) includes instructions for administering the profiles, for scoring them, and for interpreting the results; games and activities to foster language development, auditory discrimination, and visual discrimination; construction and standardization of the profiles; reliability and validity of the profiles; and intercorrelations of the profiles.

A copy of the assessment is provided in the Annotated Special Test Booklet (Appendix 6).

Young's Group Mathematics Test

This is a group administered test that assesses calculation abilities of the four basic arithmetic operations: addition, subtraction, multiplication and division. The test is suitable for use with groups of children over a wide range of ability. It is a pencil and paper test comprising oral and computation sections. The oral test required each child to perform addition and subtraction exercises which were enunciated orally and represented pictorially on the answer sheets, whilst the computation test comprised written addition and subtraction exercises. Each section is subdivided into two parts. Thus overall, the test is made up of: oral one (addition), oral two (subtraction), computation one (addition), and computation two (subtraction). The children were given two practice examples for the oral section, then instructed to continue on their own within seven seconds for each question—except for the clock question. Each question had to be repeated before the children could answer. Each computation also had two practice examples and then the children were allowed eight minutes to work on their own. See Young, 1980.

4.3 Ordinary Tests

Shortened Edinburgh Reading Test (ERT)

Shortened versions of the Edinburgh Reading Tests (Edinburgh University, 1977), developed by Dr. Philip Game, Reader in Education at the School of Education, University of London. See Appendix 3 for more details.

CHES Pictorial Language Comprehension Test (PLCT)

Language comprehension is a crucial factor in a child's ability to understand school lessons. Outdated pictures and Americanised context rendered unsuitable the otherwise excellent common tests such as the Peabody Picture Vocabulary Test (Dunn 1959) or its English equivalent, The English Picture Vocabulary Test (Brimer & Dunn, 1962). A new test suitable for British ten year-olds was, therefore, devised for the BCS70 Ten-year Follow-up by linguistic specialists. It was piloted on 400 British ten year olds, after which item analysis was carried out. A final, shortened, version in the form of a booklet covered vocabulary, sequence and sentence comprehension. See Appendix 3 for more details.

British Ability Scales (BAS)

The field of cognitive attainment was one area where it was not necessary to create new instruments. From 1965-1980 a major research project had been undertaken in Britain, with Government funding, to create a set of cognitive ability scales, which were based on norms and items indigenous to this country.

The CHES team had meetings with leading psychologists, including Professor Alistair Heron, Director of the Education Research Unit, Dept. of Psychology, University of Sheffield, and Dr. Colin Elliot, one of the creators of the British Ability Scales, a test of cognitive attainment measuring something akin to IQ (Elliot et al, 1978). It was decided to focus on two verbal and two non-verbal measures within the set of scales. Verbal sub-scales comprised word definitions (37 items) and word similarities (42 items). Non-verbal sub-scales comprised recall of digits (34 items) and matrices (28 items). Administration of the tests had to be adapted so that this could be done by teachers. The scoring of this and the next two tests was carried out when the completed forms were returned to Survey Headquarters (Butler *et al*, 1997; Eliott, Murray and Pearson, 1978).

The aim was not that of achieving some hypothetical measure of 'intelligence', but rather one of assessing the level of cognitive abilities within the child, so as to enable the effects of home and school influences to be estimated more sensitively.

The simplified administration protocol, together with the tests themselves, was made up into a special booklet by the publishers (NFER) for use within the cohort.

CHES Friendly Maths Test (FMT)

The lack of a fully acceptable mathematics test appropriate for ten-year-olds led to the development of a special test for the BCS70 Ten-year Follow-up. This was done in collaboration with Colin Appleton and John Kerley, specialists in primary mathematics. Piloted in two halves in Bristol schools each on 400 children, it consisted of a total of 72 multiple choice questions and covers in essence the rules of arithmetic, number skills, fractions, measures in a variety of forms, algebra, geometry and statistics. See Appendix 3 for more details and diagnostic grid.

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Appendix 1: Variables contained in the Dataset

There were originally five data files, each containing the same 456 cases. However, there was significant item-level non-response, e.g. only 382 children attempted the Friendly Maths Test, 375 the Edinburgh Reading Test, 369 the BAS Matrices, etc. The five data files were combined into one consolidated dataset for this deposit.

Original Data file name	**Instrument**	**Test**	**Variable names**	**Corresponding to variables in main BCS70 age 10 survey**
Educational Questionnaire	Educational Questionnaire		I1504-I1890	J10-J347
	[Derived variables]		I1891-I1913	
Educational Score Form Answers	Educational Score Form(where answers are written to questions outlined in 'CHES PLCT' and 'Instruction Booklet for Educational Tests')	Vocabulary	s8-s110	I8-I110
		Diagnostic Reading	s111-s224	I111-I224
		Naming Body Parts	s225-s274,s283	I225-I274, I283
		Social Judgement Scale	s275-s282	I275-I282
Pupil Question Form Answers	Pupil Question Form	LAWSEQ	S1008-S1023	K010-K025
		Self-Description	S1024-S1075	K026-K074
		CARALOC	S1076-S1095	K075-K094

Original Data file name	Instrument	Test	Variable names	Corresponding to variables in main BCS70 age 10 survey
Age 10 (Repeat) Tests	CHES Friendly Maths Test	Friendly Maths Test	S2504-S2575	I2504-I2575
	Shortened Ed Reading test	Edinburgh Reading Test	S3003-S3069	I3003-I3069
	British Ability Scales	BAS Word Definitions	S3504-S3540	I3504-I3540
		BAS Recall of Digits	S3541-S3574	I3541-I3574
		BAS Similarities	S3575-S3616	I3575-I3616
		BAS Matrices	S3617-S3644	I3617-I3644
	Instruction Booklet for Educational Tests	Dictation	S3808-S3864	I3808-I3864
		Copying	S3865-S3870	I3865-I3870
		Months Fwd/Backwd	S3871-S3888	I3871-I3888
	Educational Score From	Social Judgement	S3889-S3896	I3889-I3896
	[Derived variables]	Derived Test Score Variables	S4001-S4221	I4001-I4221

Original Data file name	Instrument	Test	Variable names	Corresponding to variables in main BCS70 age 10 survey
Special Tests	Special Test Booklet	Fundamental Concepts Test	I5010-I5105	None
		Copying Designs Test	I5110-x5117	
		Human Figure Drawing Test	I5118-i5149	
		Further Information on child's capabilities	I5150-I5163	
		Young's Group Mathematics Test	I5168-I5227	
		Thackray Reading Readiness Profiles	I5232-I5275	
	Special Teacher Questionnaire		I5284-I5456	None

Appendix 2: Contents of Instruments in Special Education Pack

Special Test Booklet

- Fundamental Concepts Test
- Copying Designs Test
- Human Figure Drawing Test
- [Further Information – can child understand word...]
- Young's Group Mathematics Test
- Thackray Reading Readiness Profiles

Special Teacher Questionnaire

- Profile of an average child
- Profile of study child
- Vision
- Hearing
- Expressive Language
- Comprehension
- Discrimination
- Dexterity
- Agility
- Play Activities
- SET ascertainment
- General questions re need for peripatetic teachers, therapists, psychologists, special transport, evaluation of placement etc.

For more details see: Butler, N., Despotidou, S. and Shepherd, P. (1997) *1970 British Cohort Study (BCS70) Ten-year Follow-up (formerly known as the Child Health and Education Study, CHES): a guide to the BCS 10-year data available at the Economic and Social Research Council Data Archive.* London: Social Statistics Research Unit, City University

Appendix 3: Development of the Shortened Edinburgh Reading Test (ERT), CHES Friendly Maths Test (FMT) and CHES Pictorial Language Comprehension Test (PLCT).

[The following is an extract from a Report to the Department of Education and Science (DES) at the time of the CHES 10-year survey, with notes on usage of the tests]

Reading Test (ERT)

There is a general consensus among British reading specialists that the set of four Edinburgh Reading Tests, 1978, covering all attainment levels ranging from the school beginner to the advanced secondary school reader is a modern and effective measure of reading, with built-in sub-scales to identify skills in each of the main areas of reading competence. The tests were commissioned by the Educational Institute of Scotland and the Scottish Education Department: Stage 1 covers ages 7:0 to 9:0; Stage 2 covers ages 8:6 to 10:6, Stage 3, ages 10:0 to 12:6, and Stage 4, ages 12:0 upwards.

The difficulty with these tests was that each one covered a limited age range; a further problem, mentioned by many teachers who had administered the test, was that each test level took over an hour to administer.

A member of the CHES team visited the Godfrey Thompson Unit for Academic Assessment in Edinburgh to discuss proposals for creating a shortened form of the instrument. Agreement was reached and the task of selecting items from all four levels of the test was undertaken by Dr. Philip Game, Reader in Education at the School of Education, University.

Mathematics test

After consultation with many mathematics specialists there was no consensus of opinion about a suitable mathematics test for 10-year-olds. Many current tests were considered not only out of date but also uni-dimensional. Some tests which claimed to provide sub-scales within the items had based these sub-scales on ad hoc concepts of what should be covered by a mathematics instrument.

It was learned that important research into the testing of mathematical attainment was being undertaken within the National Foundation of Educational Research (NFER), a semi-government institution which is the main repository for educational and psychological test instruments in Britain. Both the Assessment of Performance Unit, housed within the NFER and a testing body sponsored by Local Authority education departments, also linked with the NFER, were engaged on the development of modern mathematics tests based on the latest concepts of mathematical competence (for example, A.P.U. 1978). The studies of Sumner 1975 and Ward 1979 were of particular value in their analyses of the various domains of mathematical competence.

However, each organisation was at a relatively early stage in the development and piloting of its instrument, and after several meetings between the heads of these two bodies and members of the CHES team it was concluded that further help could not be offered by either body to CHES at this stage. The only solution was therefore to appoint mathematics specialists who were aware of the newer thinking in this area and to request them to create a suitable wide-ranging test which would meet the demands for a modern instrument.

Both the specialists, Colin Appleton and John Kerley, were concerned with a London Inner City programme designed to interest the less able child in mathematics; one of these specialists had recently undertaken a major research study in that field. He suggested that the items should be highly pictorial, with an emphasis on cartoon presentation. More than 220 items were created and amended on the basis of discussions with other specialists, before being submitted to CHES.

The items were again divided into two tests and administered to a new pilot sample of 400 children. Item analysis was then undertaken. This work proved difficult and it was necessary to preserve a range of items within each of the major areas of interest.

Both the teachers' and children's responses to this new style of mathematics test were assessed and reported on by a member of the Committee. In general the responses were mixed: some teachers were extremely critical of the levity of the items and said that their pupils felt the same as they did; other teachers were enthusiastic about what they felt was a refreshingly new approach to mathematics assessment, and reported that children enjoyed the test. One head reported that as a result of studying the test he planned to revise totally the mathematics curriculum in his school, to take account of new features which were stressed in the test.

The final instrument covers knowledge, concept and applications in the areas of the four basic rules, fractions, other number skills, measure in a variety of forms, geometry, algebra and statistics. As far as possible the individual items assess single rather than multiple skills. Teachers are encouraged to read out the limited number of words when poor readers do the test. The accompanying table sets out the diagnostic grid for this test.

Language

The need to assess language is generally recognised. Language comprehension is a crucial factor in the child's ability to understand school lessons, while expressive ability is concerned in a more subtle way with that child's relations not only with peers and parents but also with the teachers themselves.

The English Picture Vocabulary Test (Brimer and Dunn 1962), an Anglicised form of the well-known Peabody Picture Vocabulary Test (Dunn 1959), was considered as a possible measure of language comprehension. It was felt, however, that the E.P.V.T. was not entirely suitable for the CHES children (it is at present being updated by the N.F.E.R). Although the test covers a wide range of ability, its dated appearance and the presence of certain

pictures, familiar within the American context but relatively foreign within the British cultural environment, led to a decision that a new test should be created. Only a few other tests exist in the field (apart from clinical instruments such as the Illinois Test of Psycholinguistic Abilities) and none of these were considered suitable by the language specialists who were consulted.

Three linguists at different educational institutions, including Angela Hobsbaum, senior lecturer at the Institute of Education, University of London, with Valerie Mockridge and Frances Canning, were appointed to prepare the new test. The chief linguist worked closely with a Bristol artist, Edward Phelpz, who was commissioned to design the drawings. Considerable problems had to be resolved both in the choosing of suitable words and in the preparation of drawings that were clear and easily identified. The test was administered to a Bristol sample of 400. Item analysis was again employed and a shortened version of the test was prepared for printing.

The final test covers vocabulary, sentence comprehension and sequence comprehension.

In the area of expressive language ability a number of items were devised by Ms. Hobsbaum for answering by the child's teacher in the Educational Questionnaire. This is a difficult area of assessment and structured tests would have offered little comparability across ethnic groups and other sub-cultural groups. Accordingly emphasis was laid on the teacher's judgements of the child's expressive language in relation to what could be considered as the 'normal' expressive competence of 10-year-olds, in a set of 16 items. This approach will hopefully minimise the danger of biased judgements on the competence of minority group children.

Diagnostic Grid for Edinburgh Reading Test

Number of items: 14 groups, containing a total of 75 items

Test range: items taken from all four stages of the Edinburgh Reading Test

Age range: the test will provide a score over the full range of reading from initial reading up to a reading age equivalent of about 15

Ability distribution:

- four groups of items (19 points) test the bottom of the reading range;
- one group (7 points) tests the top of the range;
- seven groups (49 points) cover the middle of the range.

Table of Diagnostic Coverage

Conceptual area assessed	Beginning readers	Middle readers	Top readers
Vocabulary	p.1 (5)	p.4a (5) p.8 (9)	
Syntax	p.2a (5)		
Sequence	p.2b (4)	p.9 (10)	
Comprehension	p.3 (5)	p.4b (4) p.5 (5) p.10 (8)	p.11(7)
Retention	pp.6-7 (8)		

The preliminary selection was circulated to 12 Primary school heads in Bristol for their comments. This formed the basis for a further reduction in the number of items. At this stage the items were divided it two separate tests and these tests were administered to a sample of forty 9, 10 and 11-year-old children in schools from a variety of socioeconomic areas in Bristol.

Following discussion with Professor Harvey Goldstein, of the University of London, the results were analysed by Dr. Robert Wood, of the Schools Examination Unit, University of London, using a recently developed American computer program for item analysis. Several reading specialists as well as Dr. Wood and the CHES team members collaborated in a study of the items shown by the analysis to have adequate discrimination; the choice of items was such as to give the test a long tail at both ends, so that the children with little or no reading ability would still achieve a valid score while at the other end the bright reader would not easily reach ceiling.

The sub-scales covered within the instrument are: vocabulary, syntax, sequence, comprehension and retention. The grid in the accompanying table provides further details. Other reading skills are assessed by instruments described later in this document.

Diagnostic Grid for Friendly Maths Test

Number of items: 6 groups, containing a total of 72 items.

Age range: The test provides a score over the full range of mathematical competence, from the earliest awareness of number operations in the first year of school up to the levels expected at around 13 years of age.

Table of Diagnostic Coverage

Main Category	Sub-Category	No. of items	Item Number		
			Knowledge	Concept	Application
Four Rules	Addition	4	3,4	1,2	-
	Subtraction	5	5,7,8,9	6	-
	Multiplication	4	10, 12	11,13	-
	Division	4	14,16	17	15
	Operations	2	-	18,19	-
		(19)			
Other Number	Place value	4	20,21	22	23
	Percentage	2	24	-	25
	Decimals	2	27	26	-
	Fractions	5	28	29,30,31,32	-
	Factors	1	33	-	-
	Number	1	-	34	-

	Sequence	1	35	-	-
	Base	1	-	36	-
	Approximation	(17)			
Measure	Time	3	37,38	-	39
	Length	2	40	41	-
	Area	2	42,43	-	-
	Volume	2	46	45	-
	Capacity	1	44	-	-
	Mass	1	48	-	-
	Temperature	1	-	49	-
	Money	4	-	52	47,50,51
		(16)			
Algebra	Operation	2	53	-	54
	Logic	2	56	-	56
	Relations	2	57	58	-
		(6)			
Geometry	Shape	2	60	-	59
	Angles	3	61	62,67	-

	Co-ordinates Symmetry	2 3 (10)	- 68	- 66	63,64 65
Statistics	Tables Graphs	1 3 (4)	70 69,71	- 72	- -
Total		**72**	**34**	**25**	**13**

See also: 1970 British Cohort Study (BCS70) Ten-year Follow-up: A Guide to the BCS70 10-year Data available at the Economic and Social Research Council Data Archive

Appendix 4: Copying Designs Test

For this survey children were asked to make two copies of each of eight designs. The following principles were followed when scoring the drawings:

1. The drawing must have the right general shape and look like what it is supposed to be
2. It should be approximately symmetrical
3. It should not be rounded
4. The drawing should not be rotated, eg: the point of the triangle should be uppermost
5. Angles must be approximately opposite each other (except for the triangle)
6. Slight bowing or irregularity of lines is allowed
7. As long as the other criteria are met, neatness is not important
8. Lines should meet approximately but as long as other criteria are met small gaps at junctions are acceptable
9. Slight crossing and overlapping of lines is permitted

Not all children completed two drawings of each design, therefore a score was given if at least one good copy was made of a given design. The total score was the sum of the scores obtained on each design, thus giving a range of 0-8. Zero score was obtained when a child attempted to copy at least one design but all attempts were judged to be poor copies.

Appendix 5: Human Figure Drawing Test

This is a modified version of the Draw-a-Man test originally devised by Florence Goodenough (1926) and later developed by Dale Harris (1963). The Harris-Goodenough test has been subjected to extensive evaluation as a measure of IQ and correlations with conventional IQ tests (Binet, Weschler, etc) averaging .4 and .5 have been reported (Scott, 1981) Harris himself suggested that the test is more indicative of 'conceptual maturity' than IQ (op cit, p. 5).This shift in emphasis gets away from the notion of unitary intelligence, and permits consideration of children's concepts of the human figure as an index or sample of their concepts generally.

The drawings produced were relatively simple and did not warrant the implementation of the full Harris-Goodenough scale of 73 items. The CHES scoring scheme was based on thirty development items suggested by Elizabeth Koppitz (1968) but used the Harris point system of scoring. This scoring scheme is summarised below. One point was scored for each item represented in the drawing, giving a maximum possible score of thirty.

Human Figure Drawing scoring scheme

The presence of any of the following features adds one point to the HFD score.

1.	Head:	Any representation
2.	Eyes:	Any representation
3.	Pupils:	Distinct circles or dots within the outlines of the eyes
4.	Eyebrows or eyelashes:	Either brows or lashes or both
5.	Nose:	Any representation
6.	Nostrils:	Dots or nostrils shown in addition to nose
7.	Mouth:	Any representation

8.	Two lips:	Two lips outlined and separated from each other: two rows of teeth only are not scored
9.	Ear:	Any representation
10.	Hair:	Any representation, or hat or cap covering head and hiding hair
11.	Neck:	Definite 'stalk' separating head and body
12.	Body:	Any representation, clear outline necessary
13.	Arms:	Any representation
14.	Arms in two dimensions:	Both arms represented by more than a single line
15.	Arms at an angle:	One or both arms pointing downwards at an angle of 30^{O} or more from horizontal position or arms raised appropriately fro activity in which figure is engaged
16.	Arms correctly attached at the shoulder:	Arms firmly connected at the shoulder with shoulder clearly evident
17.	Elbow:	Distinct angle in arm; rounded curve in arm not scored
18.	Hands:	Differentiation from hands and figures necessary such as widening of arm or demarcation from arm by sleeve or bracelet
19.	Fingers:	Any representation distinct from hands or arms; any number of fingers acceptable
20.	Correct number of fingers:	Five fingers on each hand or arm

21.	Legs:	Any representation; in case of female figures in long skirts this item is scored if distance between waist and feet is long enough to allow legs to be present under the skirt
22.	Legs in two dimensions:	Both legs represented by more than a single line
23.	Knee:	Distinct angle in one or both legs (side view), or kneecap (front view); round curve in leg not scored
24.	Feet:	Any representation
25.	Feet in two dimensions:	Feet extending in one direction from heel (side view) and showing greater length than height, or feet drawn in perspective (front view)
26.	Profile:	Head drawn in profile even if rest of figure not entirely in profile
27.	Clothing, one item or more:	Items counted as clothing: trousers, shirt, skirt, blouse, dress,(Upper part of dress separated by belt scored as blouse), necklace, watch, ring, bracelet, pipe, cigarette, umbrella, cane, gun, rake, shoes, wallet, briefcase, hat, gloves
28.	Clothing, two or more items:	Two or more items of clothing represented
29.	Clothing, four or more items:	Four or more items of clothing represented
30.	Good proportions:	Figure looks right, even if not entirely anatomically correct

Appendix 6: Annotated Special Test Booklet and Special Teacher Questionnaire

See Annotated Special Test Booklet and Special Teacher Questionnaire.pdf

Appendix 7: Annotated Educational Questionnaire

See Education Booklet.pdf

Appendix 8: Instruction Booklet for Children Taking Special Educational Tests

See Instruction Booklet for Special Educational Tests.pdf

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