RESOURCE REPORT

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A guide to the cognitive measures in five CLOSER studies

Version 2

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Versions and Updates

Version 2

This version was updated in 2024 by the CLOSER team. It includes additional information from the following study waves/sweeps:

- NCDS: Sweep 10 (age 62, 2020)
- BCS70: Sweep 11 (age 51, 2021)
- ALSPAC: Age 24 (2016-2017)
- MCS: Sweep 7 (age 17, 2018), Sweep 8 (age 23, 2023)

Version 2 also includes a summary of measures of cognition across all 19 longitudinal population studies in the CLOSER partnership.

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This resource report is part of a broader work package (CLOSER Work Package #19 'Assessment and harmonisation of cognitive measures in British birth cohorts'), that was supported by CLOSER's Innovation Fund. This initiative supported research that sought to enhance and extend the research possibilities of data from different longitudinal population studies in the UK. Data harmonisation is the process of making data from different studies more comparable. By harmonising data from different UK longitudinal studies, researchers will be able to pool data from multiple studies, an exercise that has many benefits, e.g. increased sample sizes or increased heterogeneity of samples. Moreover, data harmonisation provides us with the opportunity to examine factors that may account for between-study differences, thereby providing insight into societal changes over time.

This project brings together data from six British birth cohorts: i) Medical Research Council (MRC) National Survey of Health of Development (NSHD); ii) the 1958 National Child Development Study (NCDS); iii) the 1970 British Cohort Study (BCS70); iv) the Avon Longitudinal Study of Parents and Children (ALSPAC); v) the Millennium Cohort Study (MCS). The NSHD is funded by the Medical Research Council and hosted by the MRC Unit for Lifelong Health and Ageing at UCL. The NCDS, BCS70, MCS receive core funding from the ESRC, and are hosted by the Centre for Longitudinal Studies, UCL. The NCDS sweep at age 62, was co-funded by the MRC, the US National Institutes of Health and the Department for Work and Pensions. The BCS70 Age 46 sweep received additional funding from the MRC and the British Heart Foundation. The ALSPAC receives core funding from the MRC, Wellcome, and the University of Bristol, and is hosted by the University of Bristol.

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1. Introduction

Cognition is a broad term that refers to the mechanisms by which we acquire, process, store and ultimately use information from the environment (Shettleworth, 2009). It encompasses processes such as perception, learning, memory, and reasoning (Shettleworth, 2009). The CLOSER British birth cohorts contain a wealth of information on cognition over the life course, and the cognitive measures available in these studies have been used to answer research questions in many different fields, e.g. education (Hatch, Feinstein, Link, Wadsworth, & Richards, 2007; Schoon & Polek, 2011), public health (Henderson, Richards, Stansfeld, & Hotopf, 2012; Richards, Stephen, & Mishra, 2010), economics (Blanden, Gregg, & Macmillan, 2007), psychiatry (Richards et al., 2001), psychology (Flouri et al., 2014; G & MA, 2012; Gale et al., 2012), and political science (Denny & Doyle, 2008). However, these cognitive tests vary considerably both within and across the cohorts, and this has hindered studies of developmental trends and cross-cohort differences. Moreover, there is considerable heterogeneity in the quality and quantity of the documentation used to describe these cognitive assessments, and, to date, there has been no attempt to develop a uniform description of the key features of these instruments. Therefore, as a first step in facilitating developmental and cross-cohort studies, we provide a comprehensive description of the cognitive measures that are available in five British birth cohorts.

A companion report (https://closer.ac.uk/cross-study-data-guides/cognitive-measures-guide/cognitive-constructs/) assesses the feasibility of harmonising the cognitive measures both within and across the cohorts.

1.1 Cohorts included

This resource report documents the cognitive measures that have been administered in the following studies: i) the MRC National Survey of Health of Development (NSHD); ii) the 1958 National Child Development Study (NCDS); iii) the 1970 British Cohort Study (BCS70); iv) the Avon Longitudinal Study of Parents and Children (ALSPAC); v) the Millennium Cohort Study (MCS). A summary of cognitive measurement across the 19 longitudinal population studies in the CLOSER partnership is also provided in **Table 1**.

A brief description of each of the five studies included in detail in this report follows:

The MRC National Survey of Health of Development: The NSHD is the longest running of the British birth cohort studies. It originally consisted of a socially stratified sample (N=5,362) of men and women born to married parents in England, Scotland or Wales in March 1946. The sample was selected from an initial maternity survey of 13,687

pregnancies, consisting of all births to married women with husbands in non-manual and agricultural employment, plus a random 1-in-4 sample of comparable births to women with husbands in manual employment (Wadsworth, Kuh, Richards, & Hardy, 2006). To date, the participants have been followed up in 27 core data collections when they were aged 0, 2, 4, 6, 7, 8, 9, 10, 11, 13, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 26, 31, 36, 43, 53, 60-64, 68-69 years. At age 74 years (2020-2021), the NSHD was included in a series of COVID-19 surveys alongside the NCDS, BCS70, and MCS. More details about this study can be found at: http://www.nshd.mrc.ac.uk/.

The 1958 National Child Development Study: The NCDS follows the lives of 17,415 people born in England, Scotland and Wales in a single week in 1958 (Power & Elliott, 2006). The NCDS started in 1958 as the Perinatal Mortality Survey and captured 98% of the total births in Great Britain in a week. The cohort has been followed up a total of eleven times at age 7, 11, 16, 23, 33, 42, 44, 46, 50, 55 and most recently at 62 years. NCDS was also part of a series of COVID-19 surveys alongside the NSHD, BCS70 and MCS. Additional information on these sweeps can be found at: https://cls.ucl.ac.uk/cls-studies/1958-national-child-development-study/.

The 1970 British Cohort Study: The BCS70 follows the lives of 17,198 people born in England, Scotland and Wales in a single week in 1970 (J. Elliott & Shepherd, 2006). The BCS70 began as the British Births Survey and participants have since been followed up ten times at ages 5, 10, 16, 26, 30, 34, 38, 42, 46 and the most recent at age 51 years. In addition to the main BCS70 sweeps, the following sub-studies have been conducted: 1) COVID-19 Survey (2020-2021); 2) Twins study (2008-2009); 3) Age 21 sweep (1992); 4) Age 7 sweep (1977); and 5) 22 month and 42 month sweeps (1972-1973). For further details of these sub-studies, see https://cls.ucl.ac.uk/cls-studies/1970-british-cohort-study/.

The Avon Longitudinal Study of Parents and Children: The ALSPAC charts the lives of 14,541 people born in the former county of Avon between April 1991 and December 1992 (Boyd et al., 2013; Fraser et al., 2013). Assessments have been administered frequently, with more than a hundred data collection time points between birth and 31 years of age. Data is collected on both parents and children, and more recently ALSPAC has started to recruit and collect data on the children of the original cohort members. Further information can be found at: http://www.bristol.ac.uk/alspac/.

The Millennium Cohort Study: The MCS follows the lives of 19,517 children born in England, Scotland, Wales and Northern Ireland in 2000-2001 (Connelly & Platt, 2014). Since the initial birth survey at 9 months, the cohort has been followed up seven times at ages 3, 5, 7, 11, 14, 17 and most recently at age 23 years. MCS was also included in a series

of COVD-19 surveys alongside NHDS, NCDS and BCS70. A description of these sweeps is available at: https://cls.ucl.ac.uk/cls-studies/millennium-cohort-study/.

More details on each of the cohorts, including cohort profiles and guidance on accessing the data, can be found at https://www.closer.ac.uk/closer/explore-the-studies/.

1.2 Measuring cognition

Researchers from different disciplines often approach the study of cognition from different perspectives, which can lead to inconsistencies in terminology. For instance, the term cognitive ability is most commonly used in the social sciences (e.g. education, economics, psychology), whereas the term cognitive functioning appears more often in medical disciplines (e.g. geriatric medicine). Both terms broadly refer to individual differences in mental processes of thinking, and the demarcation between them is poorly defined. At a more specific level, different terms may be applied to different groups of functionally connected cognitive processes. For example, the various cognitive mechanisms associated with attentional control (i.e. coordinating goal-directed behaviour) have been conceptualized as executive functioning by neuropsychologists and as working memory capacity by experimental psychologists (McCabe, Roediger, McDaniel, Balota, & Hambrick, 2010).

Along with differences in terminology, measurement strategies can vary depending on factors such as academic discipline, historical factors, research setting, and characteristics of the population being studied. For instance, researchers with an educational background may be more likely to measure skills and abilities that are developed in the school environment, e.g. pen and paper tests of reading comprehension and arithmetic. Researchers from a cognitive neuroscience background may be more likely to administer instruments that aim to capture specific cognitive processes, e.g. computer-administered tests of working memory and visual processing.

In terms of research setting, due to time and resource constraints, large population-based studies may be forced to rely on short, easy-to-administer cognitive tests (e.g. Brown and Dodgeon (2010)), whereas smaller-scale studies may have the opportunity to administer more comprehensive assessment batteries (e.g. Villa et al. (2017)). Moreover, measures that are ostensibly similar in content may serve radically different purposes, e.g. tests of verbal fluency can be used to profile executive function in the general adult population (e.g. Ardila, Rosselli, Matute, and Guajardo (2005)), or as part of a screener for dementia in individual clinical assessments (e.g. Mathuranath, Nestor, Berrios, Rakowicz, and Hodges (2000)).

Given the above-described heterogeneity in the study of cognition, we aim to be as inclusive as possible and document all measures of cognition that are available in five key British birth cohorts, regardless of academic discipline, methodology, function or participant (e.g. cohort member, cohort member's mother).

1.3 Conventions in the available tests

In discussing cognitive measures that are available in the cohorts, it is possible to draw a distinction between tests of achievement and tests of ability (Dickens, 2008). Achievement tests are used to measure knowledge and competence accumulated within a particular area, e.g. reading skills, language skills, arithmetic and mathematics (Levy & Goldstein, 1984). Ability tests typically assess an individual's capability of solving unfamiliar problems, usually by employing some form of reasoning (e.g. verbal, numeric, visuospatial) (Levy & Goldstein, 1984). This distinction is analogous to the idea of crystallised and fluid intelligence (see **section 1.6**). Although these types of tests may seem well-differentiated, scores tend to correlate highly due to functional overlap (Levy & Goldstein, 1984). Indeed, Dickens (Dickens, 2008; Levy & Goldstein, 1984) argues that it is impossible to measure ability without also measuring the test taker's reading or verbal comprehension. Furthermore, any reasoning task that involves some form of acquired knowledge (e.g. geometry, arithmetic, general knowledge) will also be impacted by the individual's level of achievement. As such, the most widely used batteries of cognitive assessment typically include tests of both ability and achievement, e.g. the Wechsler scales (Wechsler, 1991) and the British Ability Scales (C. D. Elliott, 1986). Given this theoretical and functional overlap, this report documents both achievement and ability tests.

The tests that were administered during childhood in the earlier cohorts appear to reflect the curricula of those periods. For example, the early arithmetic tests contain several conventions that are no longer used in the teaching of mathematics. Moreover, we noted a trend whereby tests became more reflective of achievement and attained knowledge as children entered adolescence. We do not, however, include educational qualifications and school educational attainment measures, e.g. key stage national curriculum tests. Educationalists have criticised these tests for various reasons, such as: i) changes in the curricula and tests over time, ii) the high stakes for teachers and schools encouraging a "teaching to the test" mentality, and iii) questions regarding political interference in the monitoring and reporting of national standards (see Tymms (2004) for a more detailed discussion of this issue).

Prior to the 1970s, no standardised tests of cognitive ability had been developed for use in the British population (Ward & Fitzpatrick, 1970). As such, many of the tests administered

during childhood in the earlier cohorts (NSHD, NCDS) were devised specifically for the cohort studies by educationalists. In particular, many of the childhood tests were developed at the National Foundation for Educational Research (NFER) (Pigeon, 1964). Standardised ability tests (e.g. the British Ability Scales) became the primary form of assessment beginning at the age 10 sweep of the BCS70 in 1980. The exact content of such standardised tests varies in order to be age appropriate for the study children. Moreover, there are important mode effects to consider; traditional pen and paper methods and physical tasks (e.g. block building) were more common in childhood (particularly in the older cohorts), whereas modern assessment formats (e.g. computer-assisted personal interviewing; CAPI) are used more regularly in later sweeps/cohorts. External factors may also have contributed to bias in the tests; e.g. at the age 16 sweep of the BCS70, national teacher strikes meant that a smaller than expected number of cognitive tests were returned, and these were completed in different settings (approximately 3,000 in schools, approximately 2,000 in homes).

Regarding the cognitive measures that were administered in adulthood (available only in NSHD, NCDS and BCS70), two trends became evident. First, there was a considerable period (when participants were aged in their 20s to early 40s) over which little information on cognition was gathered. In the NCDS and BCS70, tests during this period focused on basic skills in adult literacy and numeracy, as well as cognitive measures from the children of the cohort members. Second, the measures of cognition that were administered in mid-life and beyond differed considerably from those used in childhood. Whereas the measures administered in childhood were comprised largely of tests of ability (e.g. novel problem solving) and achievement (e.g. literacy and numeracy), the measures administered in adulthood (beginning primarily as participants entered their 40s) were more reflective of cognitive skills/abilities that impact on functioning in day-to-day adult life, e.g. short-term memory, visual scanning ability, and verbal fluency. Recent research, however, has demonstrated that these common adult tests demonstrate structural and functional overlap with childhood tests of ability and achievement (Jewsbury, Bowden, & Duff, 2016). As such, in addition to the childhood measures outlined above, we describe all the available measures of general cognitive function in adulthood.

1.4 Summary of cognition measurement across the CLOSER partner studies

Many of the CLOSER partner studies have measured cognition to some degree at a particular life stage or across multiple life stages - see **Table 1** for a high-level summary.

Table 1: Summary of cognition measurement across the CLOSER partner studies

Study name	Cognition measurement across life stages**					
	Infancy	Childhood	Adolescence	Early adulthood	Mid adulthood	Older adulthood
Avon Longitudinal Study of Parents and Children (ALSPAC)*	✓	✓	✓	✓	✓	✓
1970 British Cohort Study (BCS70)*	✓	✓		✓	✓	
Born in Bradford (BiB)		✓	✓			
English Longitudinal Study of ageing (ELSA)						✓
Generation Scotland			✓	✓	✓	✓
Growing Up in Scotland (GUS)		✓	✓			
Health and Employment after Fifty (HEAF)						
Hertfordshire Cohort Study (HCS)						✓
Longitudinal Survey of Young People in England: Cohort 2 (LSYPE2)			✓			
Millennium Cohort Study (MCS)*	✓	✓	✓			
1958 National Child Development Study (NCDS)*		✓	✓		✓	✓
1946 National Study of Health and Development (NSHD)*		✓	✓	✓	✓	✓
Next Steps					✓	
Northern Ireland Cohort for the Longitudinal Study of Ageing (NICOLA)						✓
Office for National Statistics Longitudinal Study (ONS LS)						
Southampton Women's Study (SWS)		✓	✓			
Whitehall 2 (WHII)			✓			
Wirral Child Health and Development Study (WCHADS)	✓	✓				
Understanding Society: The UK Household Longitudinal				✓	✓	✓

Study (UKHLS)

*Detailed cognitive measures outlined in full in this guide

**Life course stages: Infancy (0-1 years), Childhood (1-10 years), adolescence (11-19 years), early adulthood (20-30 years), mid adulthood (30-50 years), older adulthood (>50 years)

Note: For studies not included in this guide, links are provided (where available) to the study data documentation, data dictionary or study pages outlining cognitive measurements included in the study.

1.5 Overview of the cognitive measures in five CLOSER studies

In spite of the structural and functional overlap mentioned above, the broader differences that exist between the measures administered in childhood and adulthood informed our decision to divide our description of the cognitive measures into two separate sections reflecting these different stages of life. **Table 2** presents an overview of the cognitive measures administered in the five cohorts during childhood, whereas **Table 3** outlines the instruments used in adulthood. The tables outline the name of each test by cohort and age (or decade), and the respondent who completed the test (i.e. parent, cohort member, teacher) is documented in the table footnotes.

Table 2: Overview of cognitive measures available across childhood in five British birth cohorts

Age (years)	NSHD (1946)	NCDS (1958)	BCS70 (1970)	ALSPAC (1991-92)	MCS (2000-01)
Age 0/1				**Age 4 months[1]:** - Habituation task	**Age 9 months:** - Developmental milestones (incl. motor coordination and vocabulary)

Age 1/2			**Age 22 months (1.8 years)[1]:**
			- Developmental milestones (incl. fine locomotor test, speech and language, etc.)
				Age 18 months (1.5 years)[1]:
				- Griffiths Scales of Mental Development
				  ○ The Griffiths Personal-Social Scale
				  ○ The Griffiths Hearing and Speech Scale
				  ○ The Griffiths Hand and Eye Coordination Scale
				  ○ The Griffiths Performance Scale
				
				Age 25 months (2.08 years)[1]:
				- The Reynell Developmental	

Age (years)	NSHD (1946)	NCDS (1958)	BCS70 (1970)	ALSPAC (1991-92)	MCS (2000-01)
				Language Scale (Verbal Comprehensions Scale only) - Object Naming Assessment (Phonology screening procedure)	
Age 3			**Age 42 months (3.5 years)[1]:** - Developmental milestones		**Age 3 years:** - Bas II Naming Vocabulary - Bracken School Readiness Assessment - Revised
Age 4/5			**Age 5 years:** - Schonell Reading Test - English Picture Vocabulary Test (EPVT) - Copying Designs Test (CDT) - Human Figure Drawing (HFD) - Complete a Profile Test (CPT)	**Age 49 months (4.08 years)[1]:** - Wechsler Preschool and Primary Scale of Intelligence – Revised (WPPSI-RUK) ○ Object Assembly (WPPSI-RUK) ○ Geometric Design (WPPSI-RUK) ○ Block Design (WPPSI-RUK) ○ Mazes (WPPSI-RUK) ○ Picture	**Age 5 years:** - BAS II Naming Vocabulary - BAS II Pattern Construction - BAS II Picture Similarities

Age (years)	NSHD (1946)	NCDS (1958)	BCS70 (1970)	ALSPAC (1991-92)	MCS (2000-01)
				Completion (WPPSI-RUK) ○ Information (WPPSI-RUK) ○ Comprehension (WPPSI-RUK) ○ Arithmetic (WPPSI-RUK) ○ Vocabulary (WPPSI-RUK) ○ Similarities (WPPSI-RUK) - Short-term memory (Digit Span Test) **Age 61 months (5.08 years)[1]:** - Short-term memory (Digit Span Test) - Short-term memory (Non-Word Repetition) - The Reynell Developmental Language Scale (Verbal Comprehensions Scale only) - Bus story - Initial Consonants Detection Test - Multisyllabic Word Repetition	

Age (years)	NSHD (1946)	NCDS (1958)	BCS70 (1970)	ALSPAC (1991-92)	MCS (2000-01)
Age 7		**Age 7 years:** - Southgate Group Reading Test - Problem Arithmetic Test (NFER devised) - Copying Designs (CDT) - Human Figure Drawing (HFD)		**Age 7.5 years:** - Basic reading - Phoneme deletion task - Spelling task - Letter decision task - Motor ability task	**Age 7 years:** - BAS II Word Reading - BAS II Pattern Construction - NFER Progress in Maths (adapted)
Age 8/9	**Age 8 years:** - Picture Intelligence - Reading Comprehension - Word Reading - Vocabulary			**Age 8 years:** - Wechsler Intelligence Scale for Children (WISC-III) - DANVA: Faces subtest - TEA-Ch, the Test of Everyday Attention for Children - Language development (listening comprehension, oral expression, non-word repetition/short-term memory, articulation) **Age 9 years:** - Word and non-word reading - Spelling task - Oral reading (NARA II) - Sentence decision task	
Age 10/11	**Age 11 years:** - General Ability Test	**Age 11 years:** - General Ability Test	**Age 10 years:** - Edinburgh Reading	**Age 10 years:** - Working memory	**Age 11 years:** - BAS II Verbal

Age (years)	NSHD (1946)	NCDS (1958)	BCS70 (1970)	ALSPAC (1991-92)	MCS (2000-01)
	(Verbal and Non-Verbal) - Arithmetic Test - Word Reading - Vocabulary	(Verbal and Non-Verbal) - Reading Comprehension Test (NFER) - Mathematics Test (NFER) - Copying Designs Test (CDT)	Test (Shortened Version) - Friendly Maths Test - Pictorial Language Comprehension Test (PLCT) - Spelling Dictation Task (SDT) - BAS Similarities (Word) - BAS Word Definitions - BAS Recall of Digits - BAS Matrices	(Counting Span Task) - Inhibition (Stop-Signal Task) **Age 11 years:** - TEA-Ch, the Test of Everyday Attention for Children - Higher conceptual reasoning (bike-drawing task)	Similarities - CANTAB Cambridge Gambling Task (CGT) - CANTAB Spatial Working Memory Task (SWM)
Age 12/13				**Age 12 years:** - Phonological awareness (spoonerisms) - Test of Word Reading Efficiency/Fluency (TOWRE) - Motor Skill and Movement Test **Age 13.5 years:** - Reaction time (simple, choice, digit vigilance) - Test of Word Reading Efficiency/Fluency (TOWRE)	
Age 14/15	**Age 15 years:** - The Alice Heim Group Ability Test (AH4) - The Watts-Vernon			**Age 15.5 years:** - Wechsler Abbreviated Scale of Intelligence (WASI)	**Age 14 years:** - APU Vocabulary test[2] - CANTAB Cambridge Gambling Task (CGT)

Age (years)	NSHD (1946)	NCDS (1958)	BCS70 (1970)	ALSPAC (1991-92)	MCS (2000-01)
	Reading Test - Mathematics Test			- Inhibition (Stop-Signal Task)	
Age 16/17		**Age 16 years:** - Reading Comprehension Test (NFER) - Mathematics Test (NFER)	**Age 16 years:** - Edinburgh Reading Test (Shortened Version) - APU Arithmetic Test - APU Vocabulary Test - Spelling test - BAS Matrices	**Age 17.5 years:** - Working memory (N-back task) - Information processing biases (Affective Go/No-Go Task) - Behavioural inhibition (Probability Learning and Reversal Task)	**Age 17 years[3]:** - Number Analogies (GL Assessment)
Multi-age		**Age 3 years, 11 months, and 16 days or older[4,5]:** - Peabody Picture Vocabulary Test - Revised (PPVT-R) - Peabody Individual Achievement Test (PIAT) Maths - PIAT Reading Recognition subscale - PIAT Reading Comprehension subscale - McCarthy Scale of Children's Abilities - Verbal Memory subscale - WISC Revised Digit Span subscale	**Age 3 years till 5 years 11 months[4]:** - BAS Naming Vocabulary - BAS Early Number Concepts - Copying Designs Test (same as BCS70 CDT) **Age 6 years till 16 years 11 months:** - BAS Word Reading - BAS Number Skills - BAS Spelling		

Note.

[1] Tests administered to a randomly selected sub-sample.
[2] Test administered to cohort member, mother and partner.
[3] MCS7 not available at time of writing.
[4] Tests administered to the children of cohort members.
[5] Tests completed by a sub-sample.

Table 3: Overview of cognitive measures available across adulthood in four British birth cohorts

Age period (years)	NSHD (1946)	NCDS (1958)	BCS70 (1970)	ALSPAC (1991-92)

20s	**Age 26 years:**
	- The Watts-Vernon Reading Test (with 10 additional words to reduce ceiling effects)
			Age 21 years[5]:
			- Literacy and numeracy assessments (ALBSU)
				Age 24 years:
				- Wechsler Intelligence Scale for Children (WISC-III):
				  o Digit Symbol Coding
				  o Vocabulary Task
				- Inhibition (Stop Signal Task)
				- Working memory (N-Back Task)
				- Emotion Recognition Task
				- Source Monitoring Task
				- Jumping to Conclusions Task
				- Predictive Processing Task

30s		**Age 37 years[5]:** - Basic literacy and numeracy skills (ALBSU and NFER)	**Age 34 years:** - Basic skills (Literacy and numeracy assessments) - Literacy and numeracy skills	

Age period (years)	NSHD (1946)	NCDS (1958)	BCS70 (1970)	ALSPAC (1991-92)
40s	**Age 43 years:** - Verbal Learning/ Word List Recall Test - Long-Term Recall - Visual Memory - Timed Letter Search/Letter Cancellation Test - Motor Speed and Praxis		**Age 42 years:** - APU Vocabulary Test **Age 46-47 years:** - Verbal Learning/ Word List Recall Test - Timed Letter Search/Letter Cancellation Test - Verbal Fluency (animal naming) Test	
50s	**Age 53 years:** - Verbal Learning/Word List Recall Test - Timed Letter Search / Letter Cancellation Test - Verbal Fluency (Animal Naming) Test - Prospective Memory - Delayed Verbal Memory - National Adult Reading Test (NART)	**Age 50 years:** - Verbal Learning/ Word List Recall Test - Timed Letter Search / Letter Cancellation Test - Verbal Fluency (Animal Naming) Test	**Age 50 years[6]:** - Repeat of tests at Age 46–47 with addition of National Adult Reading Test (NART)	**Age 50 years[7] (Focus on Mothers Clinic 2):** - Logic Memory - Digits Backwards - Spot the Word - Digit Symbol Coding - Verbal Fluency Test **Age 52 years[7] (Focus on Mothers Clinic 3):** - Logic Memory - Digits Backwards - Spot the Word - Digit Symbol Coding - Verbal Fluency Test **Age 53 years[7] (Focus on Mothers Clinic 4):** - Logic Memory - Digits Backwards - Spot the Word

Age period (years)	NSHD (1946)	NCDS (1958)	BCS70 (1970)	ALSPAC (1991-92)
				- Digit Symbol Coding - Verbal Fluency Test
60s	**Age 60-64 years:** - Verbal Learning/ Word List Recall Test - Timed Letter Search/Letter Cancellation Test - Reaction Time Test	**Age 62 years[6]:** - Repeat of tests at age 50		
60s/70s	**Age 68-70 years:** - Verbal Learning/Word List Recall Test - Timed Letter Search / Letter Cancellation Test - Finger Tapping Test - Addenbrooke's Cognitive Examination III (ACE-III)			

Note:

[5] Tests completed by a sub-sample.

[6] At the time of writing, data collection is complete and data will be made available for research in autumn 2024.

[7] Tests administered to the cohort members' mothers.

1.6 Specific features documented

In order to provide a comprehensive and consistent description of the cognitive measures in the five British birth cohorts, we document various features of the different tests (**Table 4**). Furthermore, in order to facilitate the comparison of these measures both within and across the cohorts, we classify each measure at a conceptual level under a common theoretical framework. Although there are multiple theoretical models that are proposed to account for individual differences in cognitive tests, we chose the Cattell-Horn-Carroll (CHC) model of cognitive ability (Schneider & McGrew, 2018) as our overarching framework. There are three primary reasons for this decision:

The CHC model is built into the theoretical framework of (or is at least compatible with) many of the cognitive tests administered in the cohorts, particularly in childhood, e.g. the British Ability Scales, the Wechsler scales. The CHC model is the most comprehensive and strongly supported, empirically derived taxonomy of cognitive abilities (Keith & Reynolds, 2010; Schneider & McGrew, 2018). The CHC model has shown a high degree of generality across different tests, including those designed under other theoretical frameworks, e.g. recent psychometric evidence has demonstrated that neuropsychological tests designed to assess executive function demonstrate structural and functional alignment with the CHC model (Jewsbury et al., 2016).

This model conceptualises cognitive ability as multidimensional and functionally integrated (Schneider & McGrew, 2018). The CHC model is hierarchical in nature, ranging from general ability (g) to broad, narrow, and specific abilities (Schneider & McGrew, 2018). Specific abilities, at the bottom of the hierarchy, are the only observable cognitive abilities, and are usually tied to specific tests (e.g. ability to repeat back sentences). Narrow-stratum abilities are inferred and are captured in clusters of highly correlated specific abilities (e.g. ability to repeat back sentences and ability to repeat back individual words may reflect a broader memory span ability). Similarly, broad-stratum abilities are reflected in clusters of correlated narrow-stratum abilities. Arguably the two most commonly discussed broad-stratum abilities are 'crystallised intelligence' and 'fluid intelligence'. Crystallised intelligence broadly refers to acquired knowledge and encompasses narrow-stratum abilities such as general knowledge, lexical knowledge, and language development (Keith & Reynolds, 2010). Fluid intelligence refers to an individual's ability to solve novel problems, without relying on acquired knowledge (Keith & Reynolds, 2010). It includes processes such as induction and sequential reasoning. The 'fluid-crystallised' split mirrors the ability vs achievement test distinction previously discussed (see **section 1.3**). By convention, abilities at the broad-stratum level are denoted with an abbreviation that begins with a capital 'G' (standing for 'general'), followed by lowercase

letters, e.g. Gc (crystallised intelligence), Gf (fluid intelligence) (Schneider & McGrew, 2018). A brief description of each of the broad stratum abilities of the CHC model is provided in **Table 4**.

Table 4: Broad-stratum abilities as defined in the CHC model of intelligence (Schneider & McGrew, 2012)

Notation	Ability	Description
Gf	Fluid reasoning/ fluid intelligence	Ability to solve 'novel' problems without relying on previously acquired knowledge.
Gsm	Short-term memory	Ability to store and manipulate information in one's immediate awareness.
Glr	Long-term storage & retrieval	Ability to store information in memory and recall this information over periods of time ranging from minutes to years. The main distinction between this and Gsm is that, in Gsm tests, there is a continuous effort to maintain awareness of the information, whereas in Glr tests the info has been placed out of conscious awareness for a specified period of time, and must be 'retrieved'.
Gs	Processing speed	Degree to which cognitive tasks can be performed quickly and without error.
Gt	Reaction time	Speed and accuracy with which decisions/judgements can be made when presented with information.
Gps	Psychomotor speed	Speed and fluidity with which body movements can be made.
Gc	Acquired knowledge/ crystallised intelligence	Skill/knowledge base acquired, e.g. knowledge of the fundamental meaning of words. Highly dependent on culture.
Gkn	Domain-specific knowledge	Mastery of specialised knowledge, e.g. foreign language proficiency, geographical knowledge.
Grw	Reading and writing	Skills related to written language, e.g. reading speed, spelling ability.
Gq	Quantitative knowledge	Knowledge/achievement related to mathematics.
Gv	Visual processing	Ability to mentally simulate and manipulate imagery.
Ga	Auditory processing	Ability to identify and process information from sound.

Go	Olfactory abilities	Ability to detect and process information from odours.
Gh	Tactile abilities	Ability to recognise and process information from touch.
Gk	Kinaesthetic abilities	The ability to detect and process meaningful information in proprioceptive sensations.
Gp	Psychomotor ability	Precision, coordination and strength of body movements.

At the highest level of the hierarchy, a general cognitive ability factor (g) is posited. Both the structure and validity of this model have been supported in many factor analytic studies (Keith & Reynolds, 2010), and general cognitive ability has been shown to be an important predictor of a wide range of life outcomes across different groups (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007).

The key features of each of the cognitive measures are documented as outlined in **Table 5**. Please be aware that over time some of the features detailed in this report may have subsequently been updated or changed.

Table 5: Outline of the key features documented for each measure of cognitive ability

Name of the cognitive ability measure	
Domain:	First, each measure will be classified at the broadest possible level, e.g. does it assess a form of verbal, or non-verbal (i.e. performance) ability.
Measures:	This section will list the more specific areas of cognition that are measured by each test, e.g. lexical knowledge, reading comprehension, general sequential reasoning, quantitative reasoning, short-term episodic memory, visual scanning, simple reaction time etc. This information will be taken from the original source documentation for the measure. If the source documentation is unavailable or does not contain this information, we will consult technical resources documented in the cohort literature.

Name of the cognitive ability measure	
CHC:	In this section, we will document the broad-stratum ability (e.g. Gc, Gf, Gsm) associated with each test. Again, this will be determined using the source documentation. If the source documentation is unavailable/inadequate, the test/task will be matched with established broad-level cognitive abilities as described in the extant literature, e.g. (Jewsbury et al., 2016). For a more detailed description of the CHC model of cognitive ability, see (Jewsbury et al., 2016; Richards, Kuh, Hardy, & Wadsworth, 1999; Schneider & McGrew, 2018). Not all cognitive tests fit within the CHC framework, for example developmental tests in early childhood and basic language and numeracy tests in adulthood. In such instances, no broad-stratum ability will be assigned to these tests. In addition, some tests may be associated with more than one broad stratum.
CLOSER source:	Here we will provide a link for CLOSER Discovery, where you can explore the characteristics of the specific sweep in which the cognitive measurement was administered.
Administration method:	Here we will describe the key features of how the test was administered, including the test administrator (e.g. teacher, psychologist, trained interviewer) and method used (e.g. computer-assisted personal interview (CAPI), pen and paper, oral response). This section will help highlight any mode effects to consider when tests are being compared within/across cohorts.
Procedure:	We provide a brief description of the test itself and the administration procedure. Details (where available) include: - Nature of questions/items - Number of questions/items - Number of sub-tasks (if appropriate) - Whether practice trials were administered - Whether prompts or encouragement were used - Duration of the test
Questionnaire:	Where possible we provide links to the original questionnaire documentation (or provide the file name), the majority of which are freely available online.

Name of the cognitive ability measure	
Scoring:	In this section we provide information on the scoring of the tests (both raw scores and any standardised/normalised scores available).
Item-level variable(s):	Here we list the relevant item-level variable names (where available). When there are multiple item-level variables in a list, these are presented as a range (e.g. "var1 – var9" meaning variables var1, var2, var3, etc…through to var9). For some tests, item-level variables are not available as either the test has not been processed or the data are not readily available at the UKDS (for further information in these cases, please contact the relevant data providers). Note, variables could be in either upper or lower case, so please check for both. Here we may also link to CLOSER Discovery (where available) where metadata about the specified variables can be explored.
Total score/derived variable(s):	Here we list (where available) any derived variables (i.e. any variables that were constructed by manipulating the original raw data) and summary/total scores for the test. For some tests, total scores were not available. We will also provide a link for CLOSER Discovery (where possible), where you can find detailed metadata about the questionnaires, questions and variables.
Descriptives:	Where total scores are available, we provide basic descriptive statistics for the tests, including number of available cases (N), mean (M), standard deviation (SD), and range of scores. We also include histograms as a means of quickly assessing the distribution of scores, enabling researchers to identify potential issues such as floor and ceiling effects. Note that, although the descriptive statistics are accurate at the time of writing, ongoing updates and improvements to the raw data by the hosts may lead to minor discrepancies with previous/future documents.

Name of the cognitive ability measure	
Age of participants:	Here we note the mean (M), standard deviation (SD), and age range (in weeks, months or years, as appropriate) of participants at time of assessment (where available).
Other sweep and/or cohort:	In the instance that the same measure has been administered in multiple waves or cohorts, this information will be recorded here. This may not mean the test is exactly the same. For example, a British Ability Scales (BAS) test previously administered, may have been subsequently revised and updated. There may also be mode effects to consider, e.g. the NSHD, NCDS and BCS70 all include word list learning tasks in mid-adulthood, however in NSHD the words are presented visually, whereas in NCDS and BCS70 they are presented aurally. In addition, we have also included references to the same tests, which have been devised by different test developers. For example, in ALSPAC the Wechsler Intelligence Scale for Children (WISC-III) was administered and includes sub-scales such as Recall of Digits which is also available in the BAS and administered in the BCS70. Tests which cover very broad domains such as mathematics and reading which are conceptually similar, but not the same test are not included in this section. For example, the mathematics tests do not cover all the same fields of mathematics i.e. arithmetic, algebra, geometry and include different questions in each of the mathematical fields.
Source:	Here we specify the original source of each test. Typical sources include scale/test manuals, published empirical articles or descriptions of the processes used to create tests specifically for a given cohort study.
Technical resources:	Here we provide details (where available) of useful technical resources and supplementary materials. Examples include user guides and methodological papers/materials (beyond the core source materials).
Example articles:	Finally, where available, we provide examples of empirical articles that have made use of the given test (in the five British birth cohorts only). This section is neither an exhaustive list, nor an endorsement of the quality of the reported research or treatment of the cognitive variables therein, rather it serves simply to provide

Name of the cognitive ability measure
examples of the measures in use.

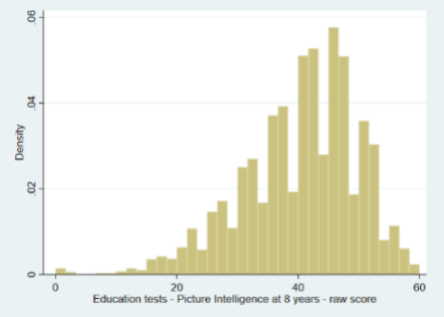
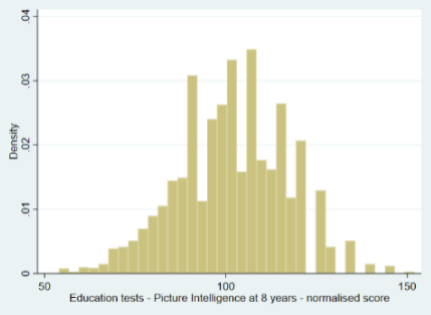
2. MRC National Survey of Health and Development (NSHD)

Along with raw and normalised variables for each cognitive test in childhood, the NSHD contains three standardised summary variables (COG8H, COG11H, and COG15H). These were calculated by transforming the raw scores of each measure to standardised z-scores, summing these z-scores, then re-standardising this total score (Richards et al., 1999). Thus, these derived variables provide a simple global cognitive functioning score.

2.1 NSHD Age 8 (1954)

2.1.1 Picture Intelligence

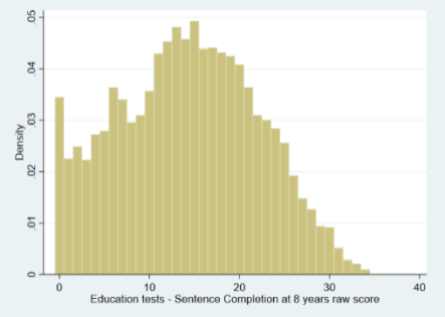
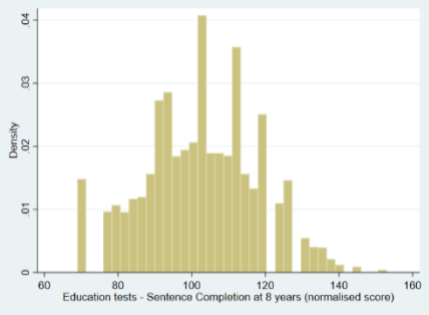
NSHD Age 8 (1954): Picture Intelligence	
Domain:	Non-verbal (reasoning)
Measures:	Non-verbal ability Induction General sequential reasoning
CHC:	Gf (fluid intelligence)
CLOSER source:	Explore this sweep in Discovery: NSHD 1954 (Age 8)
Administration method:	Teacher/psychologist/trained individual; face to face; pen and paper
Procedure:	This test was comprised of three sections. In section 1, participants were presented with 15 series, each consisting of 5 images (4 of which were conceptually similar), and were asked to select the 'odd one out'. Section 2 consisted of 20 incomplete picture series, and participants were instructed to select, from 5 different options, the correct picture to complete each series. Section 3 included 25 conceptual similarity tasks. Participants were asked to choose, from 5 options, a picture that corresponded with an established rule, e.g. "foot is to shoe as head is to hat". Each section was preceded by a practice trial. The overall testing session at age 8 lasted under 2 hours.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1954_sm_nf2.pdf
Scoring:	One point awarded per correct answer (0-60).
Item-level variable(s):	Not currently available

NSHD Age 8 (1954): Picture Intelligence	
Total score/derived variable(s):	PI8R, PI8R54, PI854, PI8N
Descriptives:	Raw score: N = 4,266 Range = 0 -60 Mean = 40.20 SD = 9.48  Normalised score: N = 4,266 Range = 54-152 Mean = 101.64 SD = 15.02 
Age of participants:	8 years 6 months
Other sweep and/or cohort:	None
Source:	Pigeon DA. Tests used in the 1954 and 1957 surveys. In: Douglas JWB, ed. *The home and the school.* London: MacGibbon and Kee, 1964. (Appendix 1.)
Technical resources:	None
Example articles:	• Richards, M., Hardy, R., Kuh, D., & Wadsworth, M. E. (2001). Birth weight and cognitive function in the British 1946 birth

NSHD Age 8 (1954): Picture Intelligence	
	cohort: longitudinal population based study. *BMJ, 322*(7280), 199-203. • Kuh, D., Richards, M., Hardy, R., Butterworth, S., & Wadsworth, M. E. (2004). Childhood cognitive ability and deaths up until middle age: a post-war birth cohort study. *International Journal of Epidemiology, 33*(2), 408-413.

2.1.2 Reading Comprehension

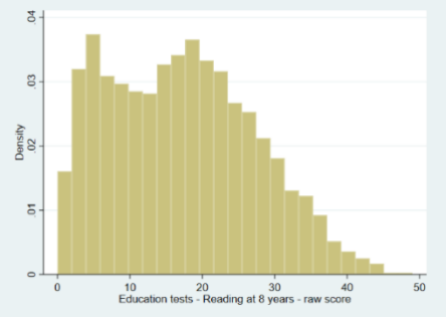
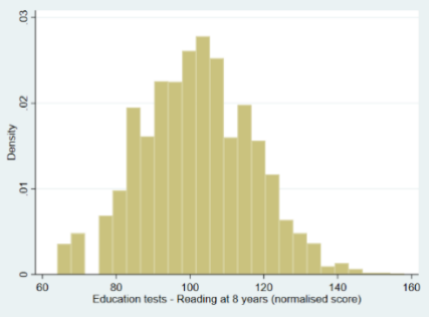
NSHD Age 8 (1954): Reading Comprehension	
Domain:	Verbal (reading)
Measures:	Word comprehension/lexical knowledge Reading comprehension Reading decoding
CHC:	Gc (Crystallized intelligence) Grw (Reading/writing)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1954 (Age 8)
Administration method:	Teacher/psychologist/trained individual; face to face; pen and paper
Procedure:	Participants were presented with a list of 35 sentences and were asked to underline the correct word (from 5 different options) to complete each sentence, e.g. “Come with me to the shops to buy some (fire, water, stone, sweets, motors)”. The overall testing session at age 8 lasted under 2 hours.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1954_sm_nf2.pdf
Scoring:	One point awarded per correct answer (0-35).
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	SC8R, SC8R54, SC854, SC8N

NSHD Age 8 (1954): Reading Comprehension	
Descriptives:	Raw score: N = 4,259 Range = 0-34 Mean = 14.20 SD = 7.78  Normalised score: N = 4,259 Range = 69-153 Mean = 102.16 SD = 15.16 
Age of participants:	8 years 6 months
Other sweep and/or cohort:	• NCDS (age 11 and 16) • NSHD (age 15 and 26) Watts-Vernon
Source:	Pigeon DA. Tests used in the 1954 and 1957 surveys. In: Douglas JWB, ed. *The home and the school*. London: MacGibbon and Kee, 1964. (Appendix 1.)
Technical resources:	None

NSHD Age 8 (1954): Reading Comprehension	
Example articles:	• Richards, M., Hardy, R., Kuh, D., & Wadsworth, M. E. (2001). Birth weight and cognitive function in the British 1946 birth cohort: longitudinal population based study. *BMJ, 322*(7280), 199-203. • Kuh, D., Richards, M., Hardy, R., Butterworth, S., & Wadsworth, M. E. (2004). Childhood cognitive ability and deaths up until middle age: a post-war birth cohort study. *International Journal of Epidemiology, 33*(2), 408-413.

2.1.3 Word Reading

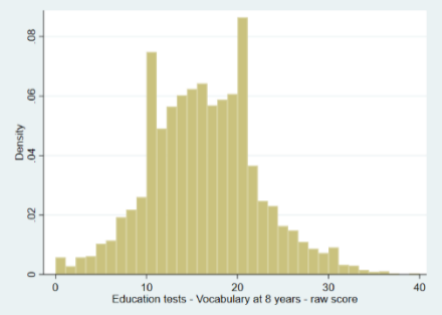
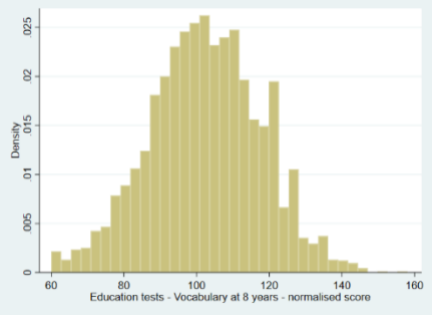
NSHD Age (1954): Word Reading	
Domain:	Verbal (reading)
Measures:	Reading decoding
CHC:	Grw (Reading/Writing)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1954 (Age 8)
Administration method:	Teacher/psychologist/trained individual; face to face; read aloud
Procedure:	Participants were presented with a list of 50 words. They were instructed to read words aloud, one by one, working down the list. The interviewer recorded the number of correct responses (only correct if usual pronunciation was used). If a child changed their initial answer to a correct answer, the item was marked as correct. If the child changed their initial answer to a wrong answer, the item was marked incorrect. Interviewers were instructed not to give any indication as to whether answers were right or wrong. In case of a delay, prompts such as “Have a try” were used. The overall testing session at age 8 lasted under 2 hours.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1954_sm_nf2.pdf
Scoring:	One point for each correct answer (0-50).

NSHD Age (1954): Word Reading	
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	R8R, R8R54, R854, R8N
Descriptives:	Raw score: N = 4,259 Range = 0-49 Mean = 17.02 SD = 10.28  Normalised score: N = 4,259 Range = 64-158 Mean = 102.00 SD = 15.33 
Age of participants:	8 years 6 months
Other sweep and/or cohort:	• NSHD (age 11) • MCS (age 7) - similar test from British Ability Scales II (BAS II) • BCS70 (children of cohort member, multi-age) - similar test from British Ability Scales II (BAS II)

NSHD Age (1954): Word Reading	
Source:	Pigeon DA. Tests used in the 1954 and 1957 surveys. In: Douglas JWB, ed. The home and the school. London: MacGibbon and Kee, 1964. (Appendix 1.)
Technical resources:	None
Example articles:	• Richards, M., Hardy, R., Kuh, D., & Wadsworth, M. E. (2001). Birth weight and cognitive function in the British 1946 birth cohort: longitudinal population based study. *BMJ, 322*(7280), 199-203. • Kuh, D., Richards, M., Hardy, R., Butterworth, S., & Wadsworth, M. E. (2004). Childhood cognitive ability and deaths up until middle age: a post-war birth cohort study. *International Journal of Epidemiology, 33*(2), 408-413.

2.1.4 Vocabulary

NHSD Age 8 (1954): Vocabulary	
Domain:	Verbal (comprehension)
Measures:	Lexical knowledge/word understanding
CHC:	Gc (Crystallized intelligence)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1954 (Age 8)
Administration method:	Teacher/psychologist/trained individual; face to face; read aloud
Procedure:	After the participant completed the word reading task, the interviewer asked the child whether they knew the meaning of each word, e.g. “What is a___”, “What do we mean by_____”. The interviewer noted the number of correct responses. The overall testing session at age 8 lasted under 2 hours.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1954_sm_nf2.pdf
Scoring:	One mark for each correct response (0 -50).

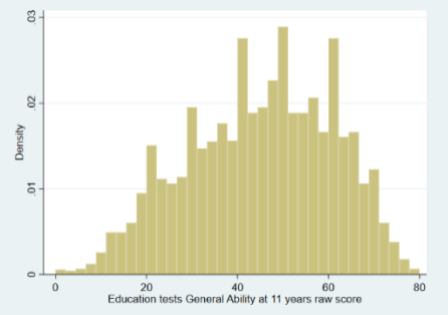
NHSD Age 8 (1954): Vocabulary	
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	VOC8R, VOC8R54, VOC854, VOC8N
Descriptives:	Raw score: N = 4,259 Range = 0-40 Mean = 16.28 SD = 5.99  Normalised score: N = 4,259 Range = 60-158 Mean = 102.25 SD = 15.31 
Age of participants:	8 years 6 months
Other sweep and/or cohort:	• NSHD (Age 11) • BCS70 (Age 10) • ALSPAC (Age 8)

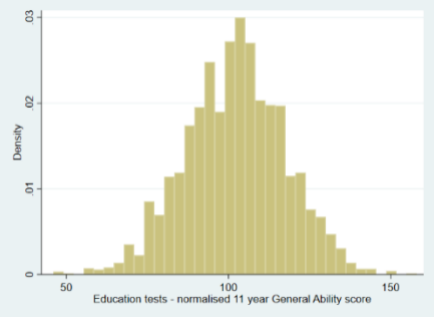
NHSD Age 8 (1954): Vocabulary	
Source:	Pigeon DA. Tests used in the 1954 and 1957 surveys. In: Douglas JWB, ed. *The home and the school*. London: MacGibbon and Kee, 1964. (Appendix 1.)
Technical resources:	None
Example articles:	• Richards, M., Hardy, R., Kuh, D., & Wadsworth, M. E. (2001). Birth weight and cognitive function in the British 1946 birth cohort: longitudinal population based study. *BMJ, 322*(7280), 199-203. • Kuh, D., Richards, M., Hardy, R., Butterworth, S., & Wadsworth, M. E. (2004). Childhood cognitive ability and deaths up until middle age: a post-war birth cohort study. *International Journal of Epidemiology*, *33*(2), 408-413.

2.2 NSHD Age 11 (1957)

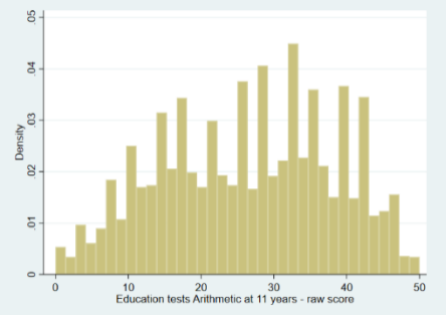
2.2.1 General Ability Test (Verbal and Non-Verbal)

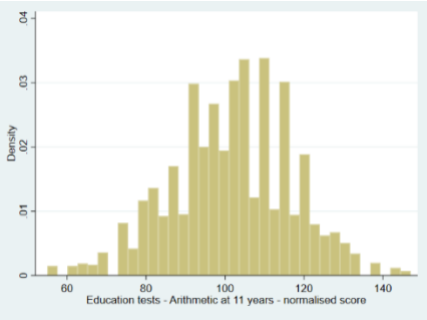
NSHD Age 11 (1957): General Ability Test (Verbal and Non-Verbal)	
Domain:	Verbal (reasoning) Non-verbal (reasoning)
Measures:	General performance ability Verbal ability Non-verbal ability Induction General sequential reasoning
CHC:	Gf (fluid intelligence) Gc (crystallised intelligence) G (general ability)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1957 (Age 11)
Administration method:	Teacher/psychologist/trained individual; face to face; pen and paper

NSHD Age 11 (1957): General Ability Test (Verbal and Non-Verbal)	
Procedure:	This test consisted of 40 verbal and 40 non-verbal items. For the verbal items, the children were presented with a list of four words that were associated either logically, semantically, or phonologically, and were asked to select the correct word (out of 5 options) to complete the series. For the non-verbal section, they were required to choose the correct shape/symbol. The overall testing session at age 11 lasted under 2 hours.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1957_sm_nf3.pdf
Scoring:	One point was awarded for each correct series (0 -80).
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	GA11R, GA11R57, NV11R, NV11R57, V11R, V11R57, GA1157, GA11N, NV1157, NV11N, V1157, V11N
Descriptives:	Raw score: N = 4,032 Range = 0-80 Mean = 45.01 SD = 15.88  Normalised score: N = 4,032 Range = 46-158 Mean = 102.09 SD = 15.30

NSHD Age 11 (1957): General Ability Test (Verbal and Non-Verbal)	
	
Age of participants (months):	Mean = 130.33, SD = 1.06, Range = 128-137
Other sweep and/or cohort:	• NCDS (Age 11)
Source:	Pigeon DA. Tests used in the 1954 and 1957 surveys. In: Douglas JWB, ed. *The home and the school*. London: MacGibbon and Kee, 1964. (Appendix 1.)
Technical resources:	None
Example articles:	• Richards, M., Hardy, R., Kuh, D., & Wadsworth, M. E. (2001). Birth weight and cognitive function in the British 1946 birth cohort: longitudinal population based study. *BMJ, 322*(7280), 199-203. • Kuh, D., Richards, M., Hardy, R., Butterworth, S., & Wadsworth, M. E. (2004). Childhood cognitive ability and deaths up until middle age: a post-war birth cohort study. *International Journal of Epidemiology*, *33*(2), 408-413.

2.2.2 Arithmetic Test

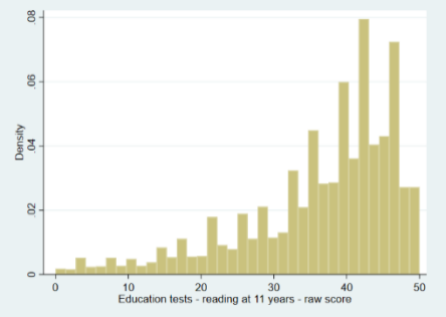
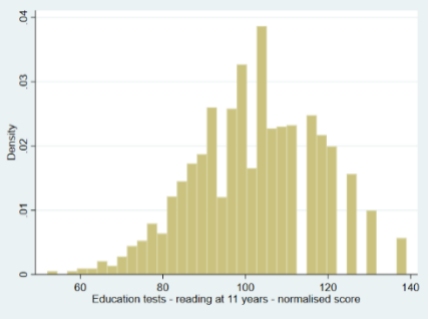
NSHD Age 11 (1957): Arithmetic Test	
Domain:	Verbal (problem questions) Non-verbal (mechanical sums)
Measures:	Mathematical ability/knowledge Mathematical achievement
CHC:	Gq (Quantitative Knowledge)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1957 (Age 11)
Administration method:	Teacher/psychologist/trained individual; face to face; pen and paper
Procedure:	This test consisted of 50 questions (20 mechanical sums, 30 problem questions). Questions assessed ability to add, subtract, multiply and divide. The overall testing session at age 11 lasted under 2 hours.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1957_sm_nf3.pdf
Scoring:	One mark for each solved problem (0 - 50).
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	A11R, A11R57, A1157, A11N
Descriptives:	Raw score: N = 4,025 N = 4,025 Range = 0-50 Range = 55-147 Mean = 26.39 Mean = 101.84 SD = 11.74 SD = 15.13  Normalised score: N = 4,025 Range = 55-147 Mean = 101.84

NSHD Age 11 (1957): Arithmetic Test	
	SD = 15.13 
Age of participants (months):	Mean = 130.33, SD = 1.06, Range = 128 - 137
Other sweep and/or cohort:	None
Source:	Pigeon DA. Tests used in the 1954 and 1957 surveys. In: Douglas JWB, ed. *The home and the school.* London: MacGibbon and Kee, 1964. (Appendix 1.)
Technical resources:	None
Example articles:	• Richards, M., Hardy, R., Kuh, D., & Wadsworth, M. E. (2001). Birth weight and cognitive function in the British 1946 birth cohort: longitudinal population based study. *BMJ, 322*(7280), 199-203. • Kuh, D., Richards, M., Hardy, R., Butterworth, S., & Wadsworth, M. E. (2004). Childhood cognitive ability and deaths up until middle age: a post-war birth cohort study. *International Journal of Epidemiology, 33*(2), 408-413.

2.2.3 Word Reading

NSHD Age 11 (1957): Word Reading	
Domain:	Verbal (reading)
Measures:	Reading decoding
CHC:	Grw (Reading/Writing)

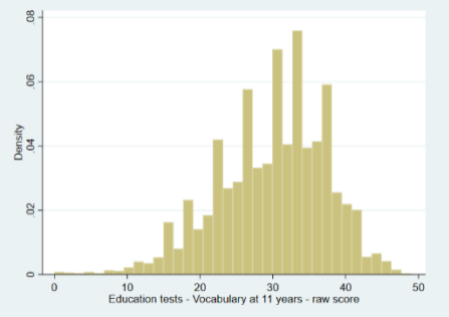
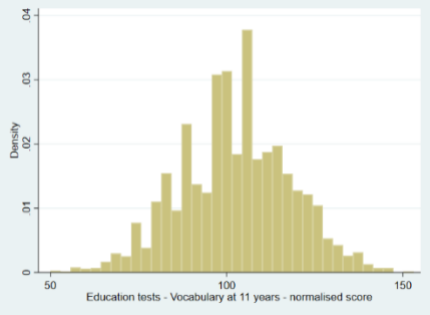
NSHD Age 11 (1957): Word Reading	
Administration method:	Teacher/psychologist/trained individual; face to face; read aloud
CLOSER Source:	Explore this sweep in Discovery: NSHD 1957 (Age 11)
Procedure:	Participants were presented with a list of 50 words. They were instructed to read words aloud, one by one, working down the list. The interviewer recorded the number of correct responses (only correct if *usual* pronunciation used). If a child changed their initial answer to a correct answer, the item was marked as correct. If the child changed their initial answer to a wrong answer, the item was marked incorrect. Interviewers were instructed not to give any indication as to whether answers were right or wrong. In case of a delay, prompts such as "Have a try" were used. The overall testing session at age 11 lasted under 2 hours.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1957_sm_nf3.pdf
Scoring:	One point per correct response (0 -50).
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	R11R, R11, R57, R1157, R11N
Descriptives:	Raw score: N = 4,027 Range = 0-50 Mean = 36.43 SD = 10.50

NSHD Age 11 (1957): Word Reading	
	 Normalised score: N = 4,027 Range = 52-139 Mean = 101.97 SD = 15.08 
Age of participants (months):	Mean = 130.33; SD = 1.06, Range = 128-137
Other sweep and/or cohort:	• NSHD (age 8) • MCS (age 7) - similar test from British Ability Scales II (BAS II) • BCS70 (children of cohort member, multi-age) - similar test from British Ability Scales II (BAS II)
Source:	Pigeon DA. Tests used in the 1954 and 1957 surveys. In: Douglas JWB, ed. *The home and the school.* London: MacGibbon and Kee, 1964. (Appendix 1.)
Technical resources:	None
Example articles:	• Richards, M., Hardy, R., Kuh, D., & Wadsworth, M. E. (2001). Birth weight and cognitive function in the British 1946 birth cohort: longitudinal population based study. *BMJ, 322*(7280), 199-203. • Kuh, D., Richards, M., Hardy, R., Butterworth, S., & Wadsworth,

NSHD Age 11 (1957): Word Reading	
	M. E. (2004). Childhood cognitive ability and deaths up until middle age: a post-war birth cohort study. *International Journal of Epidemiology, 33*(2), 408-413.

2.2.4 Vocabulary

NSHD Age 11 (1957): Vocabulary	
Domain	Verbal (comprehension)
Measures:	Lexical knowledge/word understanding
CHC:	Gc (Crystallized intelligence)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1957 (Age 11)
Administration method:	Teacher/psychologist/trained individual; face to face; read aloud
Procedure:	After the participant completed the word reading task, the interviewer asked the child whether they knew the meaning of each word, e.g. "What is a___", "What do we mean by_____". The interviewer noted the number of correct responses. The overall testing session at age 11 lasted under 2 hours.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1957_sm_nf3.pdf
Scoring:	One mark for each correct word (0 -50).
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	VOC11R, VOC11R57, VOC1157, VOC11N

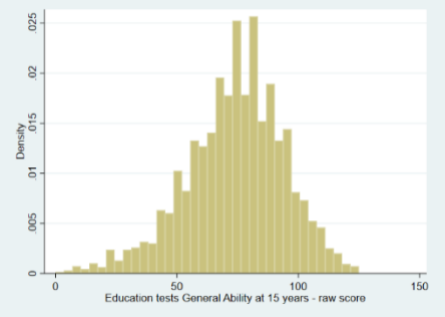
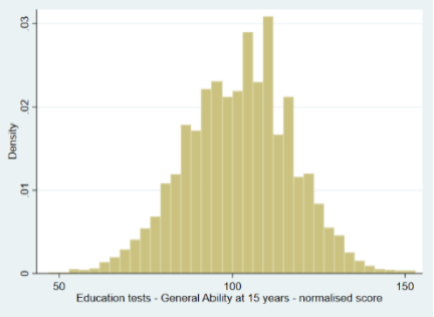
NSHD Age 11 (1957): Vocabulary	
Descriptives:	Raw score: N = 4,027 Range = 0-49 Mean = 29.99 SD = 7.45  Normalised score: N = 4,027 Range = 50-153 Mean = 102.25 SD = 15.33 
Age of participants (months):	Mean = 130.33, SD = 1.06, Range = 128-137
Other sweep and/or cohort:	• NSHD (Age 8) • BCS70 (Age 10) • ALSPAC (Age 8)
Source:	Pigeon DA. Tests used in the 1954 and 1957 surveys. In: Douglas JWB, ed. *The home and the school*. London: MacGibbon and Kee, 1964. (Appendix 1.)
Technical resources:	None

NSHD Age 11 (1957): Vocabulary	
Example articles:	• Richards, M., Hardy, R., Kuh, D., & Wadsworth, M. E. (2001). Birth weight and cognitive function in the British 1946 birth cohort: longitudinal population based study. *BMJ, 322*(7280), 199-203. • Kuh, D., Richards, M., Hardy, R., Butterworth, S., & Wadsworth, M. E. (2004). Childhood cognitive ability and deaths up until middle age: a post-war birth cohort study. *International Journal of Epidemiology, 33*(2), 408-413.

2.3 NSHD Age 15 (1961)

2.3.1 The Alice Heim Group Ability Test (AH4)

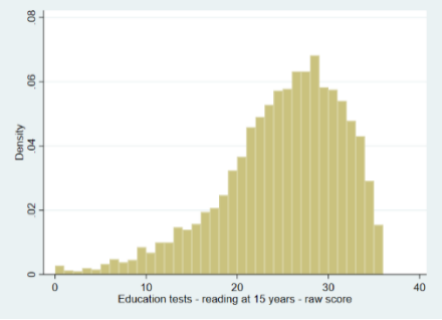
NSHD Age 15 (1961): The Alice Heim Group Ability Test (AH4)	
Domain:	Verbal and non-verbal ability
Measures:	General ability Verbal ability Non-verbal ability Induction General sequential reasoning Quantitative Reasoning
CHC:	Gf (fluid intelligence) Gc (crystallised intelligence) G (general ability)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1961 (Age 15)
Administration method:	Teacher; face to face; pen and paper
Procedure:	The AH4 contains 130 items, with 65 items each measuring verbal and non-verbal ability. The items include series completion, mental arithmetic, vocabulary, and reasoning by analogy. Participants were given 10 practice items before the non-verbal section, and 12 practice items before the verbal section. Raw and normalised scores (comparable to a standard IQ score) are available. The total time of administration was approximately 30

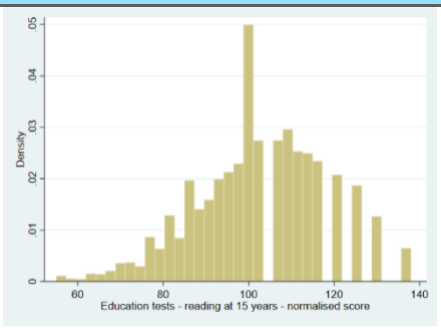
	minutes.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1961_sm_nf4.pdf
Scoring:	One point per correct answer; 0-65 (verbal/non-verbal); 0-135 (general).
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	GA15R, GA15R61, NV15R, NV15R61, V15R, V15R61, GA1561, GA15N, NV1561, NV15N, V1561, V15N
Descriptives:	Raw score: N = 4,019 Range = 0-125 Mean = 73.96 SD = 20.19  Normalised score: N = 4,017 Range = 47-153 Mean = 101.88 SD = 15.26 

NSHD Age 15 (1961): The Alice Heim Group Ability Test (AH4)	
Age of participants (months):	Mean = 174.54, SD = 2.12, Range = 172-182
Other sweep and/or cohort:	None
Source:	Heim, A. W. (1955). Manual for the Group test of General Intelligence AH4. London, England: National Foundation for Educational Research.
Technical resources:	Pigeon DA. Details of the fifteen years tests. In: Douglas JWB, Ross JM, Simpson HR, eds. *All Our Future*. London: Davies, 1968; Appendix 1.
Example articles:	• Richards, M., Shipley, B., Fuhrer, R., & Wadsworth, M. E. (2004). Cognitive ability in childhood and cognitive decline in mid-life: longitudinal birth cohort study. *BMJ, 328*(7439), 552. • Cooper, R., Richards, M., & Kuh, D. (2017). Childhood cognitive ability and age-related changes in physical capability from midlife: Findings from a British birth cohort study. *Psychosomatic Medicine, 79*(7), 785.

2.3.2 The Watts-Vernon Reading Test

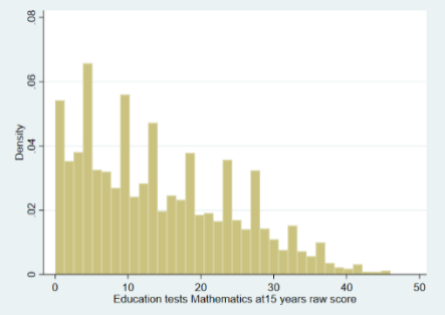
NSHD Age 15 (1961): The Watts-Vernon Reading Test	
Domain:	Verbal (reading)
Measures:	Word comprehension/lexical knowledge Reading comprehension Reading decoding
CHC:	Gc (Crystallized Intelligence) Grw (Reading/Writing)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1961 (Age 15)

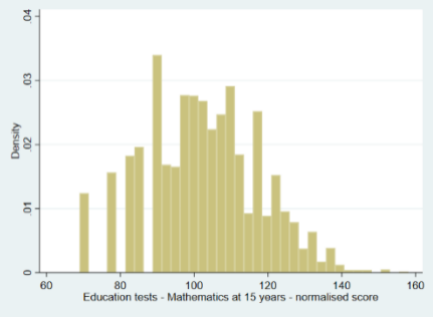
NSHD Age 15 (1961): The Watts-Vernon Reading Test	
Administration method:	Teacher; face to face; pen and paper
Procedure:	Participants were presented with a list of 35 sentence, and were asked to underline the correct word (from 5 different options) to complete each sentence, e.g. "You can buy stamps at a post (station, house, shop, man, office)". The total time of administration was approximately 15 minutes (10 minutes working time).
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1961_sm_nf4.pdf
Scoring:	One mark for each correct sentence (0-35).
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	R15R, R15R61, R1561, R15N
Descriptives:	Raw data: N = 4,018 Range = 0-36 Mean = 24.47 SD = 6.66  Normed data: N = 4,015 Range = 55-138 Mean = 102.24 SD = 15.12

NSHD Age 15 (1961): The Watts-Vernon Reading Test	
	
Age of participants (months):	Mean = 174.54, SD = 2.12, Range = 172-182
Other sweep and/or cohort:	• NSHD (age 8 and 26) • NCDS (age 11 and 16)
Source:	Ministry of Education (1950). Reading Ability. London: HMSO
Technical resources:	Pigeon DA. Details of the fifteen years tests. In: Douglas JWB, Ross JM, Simpson HR, eds. All Our Future. London: Davies, 1968; Appendix 1.
Example articles:	• Richards, M., Shipley, B., Fuhrer, R., & Wadsworth, M. E. (2004). Cognitive ability in childhood and cognitive decline in mid-life: longitudinal birth cohort study. *BMJ, 328*(7439), 552. • Cooper, R., Richards, M., & Kuh, D. (2017). Childhood cognitive ability and age-related changes in physical capability from midlife: Findings from a British birth cohort study. *Psychosomatic Medicine, 79(7)*, 785.

2.3.3 Mathematics Test

NSHD Age 15 (1961): Mathematics Test	
Domain:	Verbal (arithmetic)
Measures:	Mathematical ability/knowledge Mathematical achievement
CHC:	Gq (Quantitative Knowledge)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1961 (Age 15)

NSHD Age 15 (1961): Mathematics Test	
Administration method:	Teacher; face to face; pen and paper
Procedure:	Participants were administered a 47-item mathematics test, which tested arithmetic, geometry, trigonometry, and algebra. Duration: The total time of administration was approximately 30 minutes (25 minutes working time). Data were heavily positively skewed, indicating the test was too difficult.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1961_sm_nf4.pdf
Scoring:	One mark for each correct item (0-47).
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	M15R, M15R61, M1561, M15N
Descriptives:	Raw score: N = 4,015 Range = 0-46 Mean = 14.26 SD = 10.21  Normalised score: N = 4,015 Range = 69-158 Mean = 102.59 SD = 15.30

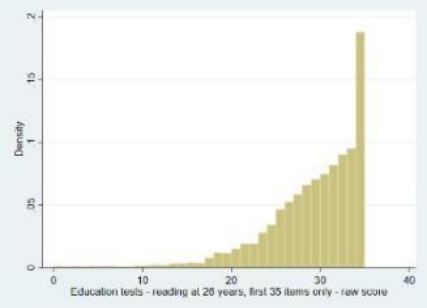
NSHD Age 15 (1961): Mathematics Test	
	
Age of participants (months):	Mean = 174.54, SD = 2.12, Range = 172-182
Other sweep and/or cohort:	None
Source:	Pigeon DA. Details of the fifteen years tests. In: Douglas JWB, Ross JM, Simpson HR, eds. *All Our Future*. London: Davies, 1968; Appendix 1.
Technical resources:	None
Example articles:	• Richards, M., Shipley, B., Fuhrer, R., & Wadsworth, M. E. (2004). Cognitive ability in childhood and cognitive decline in mid-life: longitudinal birth cohort study. *BMJ, 328*(7439), 552. • Cooper, R., Richards, M., & Kuh, D. (2017). Childhood cognitive ability and age-related changes in physical capability from midlife: Findings from a British birth cohort study. *Psychosomatic Medicine, 79*(7), 785.

2.4 NSHD Age 26 (1972)

2.4.1 The Watts-Vernon Reading Test

NSHD Age 26 (1972): The Watts-Vernon Reading Test	
Domain:	Verbal (reading)
Measures:	Word comprehension/lexical knowledge Reading comprehension Reading decoding

NSHD Age 26 (1972): The Watts-Vernon Reading Test	
CHC:	Gc (Crystallized Intelligence) Grw (Reading/Writing)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1972 (Age 26)
Administration method:	Trained interviewer; face to face; pen and paper
Procedure:	Participants were presented with a list of 45 sentences (35 from the test administered at age 15, and an additional 10 to increase difficulty and avoid ceiling effects). Participants were asked to underline the correct word (from 5 different options) to complete each sentence, e.g. "You can buy stamps at a post (station, house, shop, man, office)".
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1972_t.pdf
Scoring:	One mark for each correct sentence (0-45).
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	WV26R, R26R, R26N

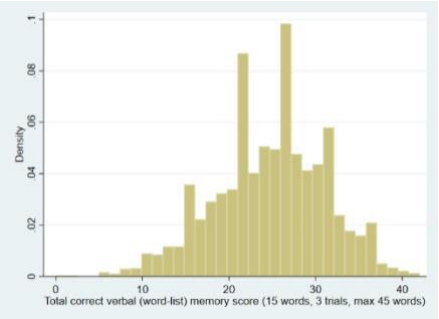
NSHD Age 26 (1972): The Watts-Vernon Reading Test	
Descriptives:	Raw score: N = 3,715 Range = 0-35 Mean = 28.76 SD = 5.40 
Age of participants (months):	Mean = 315.88, SD = 6.04, Range = 312-356
Other sweep and/or cohort:	• NSHD (Age 8 and 15) • NCDS (age 11 and 16)
Source:	Ministry of Education (1950). *Reading Ability*. London: HMSO
Technical resources:	Pigeon DA. Details of the fifteen years tests. In: Douglas JWB, Ross JM, Simpson HR, eds. *All Our Future*. London: Davies, 1968; Appendix 1.
Example articles:	Lovell, K., Gray, E. A., & Oliver, D. E. (1964). A further study of some cognitive and other disabilities in backward readers of average non-verbal reasoning scores. *British Journal of Educational Psychology, 34*(3), 275-279.

2.5 NSHD Age 43 (1989)

2.5.1 Verbal Learning/Word List Recall Test

NSHD Age 43 (1989): Verbal Learning/Word Recall Test	
Domain:	Verbal (memory)

NSHD Age 43 (1989): Verbal Learning/Word Recall Test	
Measures:	Attention Short-term episodic memory Verbal memory Free-recall memory
CHC:	Glr (Long-Term Storage and Retrieval)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1989 (Age 43)
Administration method:	Research nurse; face to face; pen and paper
Procedure:	Participants were shown a list of 15 words at a rate of one word every two seconds. They were then asked to right down as many words recalled as possible. This trial was done a total of three times, and a total score was calculated as the sum of the words correctly recalled over the three trials.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1989_b_sc.pdf
Scoring:	One point for every correctly recalled word (0-45).
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	WL10189 - WL31589, WLT89 Explore these variables in Discovery: NSHD 1989 Self completion Questionnaire Dataset.

NSHD Age 43 (1989): Verbal Learning/Word Recall Test	
Descriptives:	Raw score: N = 3,059 Range = 0-42 Mean = 24.72 SD = 6.39 
Age of participants (months):	Mean = 521.84, SD = 2.19, Range = 514-533
Other sweep and/or cohort:	• NCDS (Age 50, Age 62)* • BCS70 (Age 46-47)* • NSHD (Age 53, 60-64, 68-70 years) *1 trial only. 10 words, presented aurally.
Source:	This task was developed specifically for this study by the NSHD team led by Prof Bryan Rodgers. Similar tasks have been used to measure verbal learning for decades, e.g. Bush and Mosteller (1955).
Technical resources:	None
Example articles:	• Richards, M., Kuh, D., Hardy, R., & Wadsworth, M. (1999). Lifetime cognitive function and timing of the natural menopause. *Neurology, 53*(2), 308-308. • Richards, M., Shipley, B., Fuhrer, R., & Wadsworth, M. E. (2004). Cognitive ability in childhood and cognitive decline in mid-life: longitudinal birth cohort study. *BMJ, 328*(7439), 552.

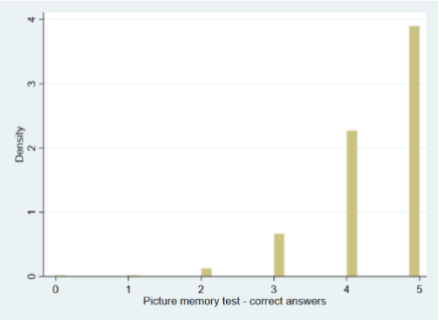
2.5.2 Long-term Recall

NSHD Age 43 (1989): Long-term Recall	
Domain:	Verbal (memory)
Measures:	Long term recall/memory Episodic memory
CHC:	None
CLOSER Source:	Explore this sweep in Discovery: NSHD 1989 (Age 43)
Administration method:	Research nurse; face to face; read aloud
Procedure:	Two sets of questions were used to assess long-term (episodic) memory. At the beginning of the interview, participants were asked to recall: i) the year, ii) the month, and iii) the day of the week in which the last interview was conducted. Later in the interview, participants were asked to recall what specific physical measurements were taken by the nurse at the last interview. Interviewers noted any of the following measures that were taken: i) pulse, ii) blood pressure, iii) lung function, iv) height, v) weight, vi) arm circumference, vii) chest circumference, and viii) abdominal circumference. A note was taken of any additional measures reported by participants that were not taken at the previous interview.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1989_a_main.pdf
Scoring:	One mark for every correctly remembered item (0-11).
Item-level variable(s):	LINTY89, LINTM89, LINTD89, MEMAB89, MEMAC89, MEMBP89, MEMCC89, MEMHT89, MEMLG89, MEMOT89, MEMPR89, MEMWT89
Total score/derived variable(s):	None
Descriptives:	None available
Age of participants (months):	Mean = 521.84, SD = 2.19, Range = 514-533

NSHD Age 43 (1989): Long-term Recall	
Other sweep and/or cohort:	None
Source:	Designed specifically for the study
Technical resources:	None
Example articles:	Unknown

2.5.3 Visual Memory

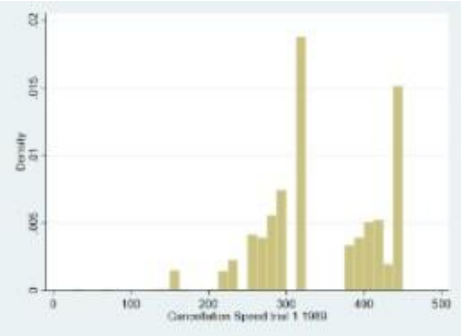
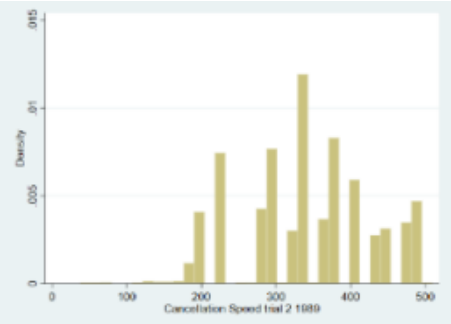
NSHD Age 43 (1989): Visual Memory	
Domain:	Non-verbal (memory)
Measures:	Attention Short-term episodic memory Visual memory Free-recall memory
CHC:	Glr (Long-Term Storage and Retrieval) Gv (Visual Processing)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1989 (Age 43)
Administration method:	Research nurse; face to face; read aloud
Procedure:	Cohort members were presented with 5 cards, each with a unique picture. They were asked to memorise the contents of the cards, and were permitted to look at the cards for 30 seconds. Later in the interview (after medical examination and questions about hearing and diet), participants were asked to recall what was on the five cards.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1989_a_main.pdf
Scoring:	One mark for each correctly recalled picture (0-5).

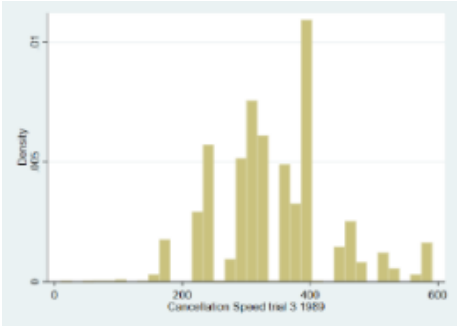
NSHD Age 43 (1989): Visual Memory	
Item-level variable(s):	PIC189 - PIC589
Total score/derived variable(s):	PICIN89, PICOK89 Explore these variables in Discovery: NSHD 1989 Main Questionnaire Dataset
Descriptives:	Raw score: N = 3,225 Range = 0-5 Mean = 4.41 SD = 0.79 
Age of participants (months):	Mean = 521.84, SD = 2.19, Range = 514-533
Other sweep and/or cohort:	None
Source:	This task was developed specifically for this study by the NSHD team led by Prof Bryan Rodgers. Similar measures of visual recall have been used in studies of memory for decades (e.g. Shiffrin (1973)).
Technical resources:	None
Example articles:	• Richards, M., Kuh, D., Hardy, R., & Wadsworth, M. (1999). Lifetime cognitive function and timing of the natural menopause. *Neurology, 53*(2), 308-308. • Richards, M., Hardy, R., Kuh, D., & Wadsworth, M. E. (2001). Birth weight and cognitive function in the British 1946 birth

NSHD Age 43 (1989): Visual Memory	
	cohort: longitudinal population based study. *BMJ, 322*(7280), 199-203.

2.5.4 Timed Letter Search/Letter Cancellation Test

NSHD Age 43 (1989): Timed Letter Search/Letter Cancellation Test	
Domain:	Processing speed
Measures:	Attention/concentration Mental speed Visual scanning
CHC:	Gv (Visual Processing) Gs (Processing Speed)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1989 (Age 43)
Administration method:	Research nurse; face to face; pen and paper
Procedure:	The participant was given a page consisting of three blocks of random letters arranged in rows (15, 17, 20 letters) and columns (all 30 letters). Beginning with the first block, they were instructed to cross out as many target letters ("Ps" and "Ws") as possible within a one-minute timeframe (the interviewer demonstrated). They were instructed to move onto the second block once the first minute was up, and then move to the final block once the second minute was up. The test was stopped at the end of the third minute. Respondents were instructed to work across each row from left to right as if they were reading a page and they were asked to perform the task as quickly and accurately as possible.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1989_a_main.pdf
Scoring:	The number of hits, misses and row/column reached were recorded, meaning multiple scoring schemes are possible. Although there is no definitive scoring system used, the most widely adopted approach is to calculate speed (number of letters

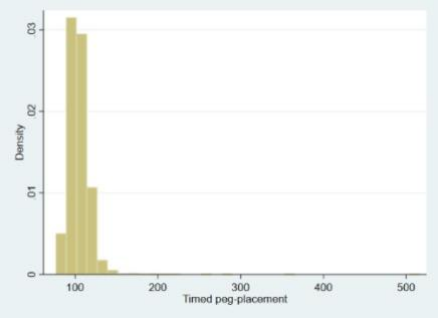
NSHD Age 43 (1989): Timed Letter Search/Letter Cancellation Test	
	scanned) and accuracy (dividing the number of missed targets for each trial by the corresponding speed score).
Item-level variable(s):	VSCL189-VSRW389
Total score/derived variable(s):	CANSP189, CANSP289, CANSP389, CANSPa89 Explore these variables in Discovery: NSHD 1989 Self Completion Questionnaire Dataset
Descriptives:	Raw score: (Trial 1) N = 3,151 Range = 25-450 Mean = 343.80 SD = 76.70  (Trial 2) N = 3,155 Range = 38-509 Mean = 339.41 SD = 85.12  (Trial 3) N = 3,139 Range = 10-591 Mean = 342.80

NSHD Age 43 (1989): Timed Letter Search/Letter Cancellation Test	
	SD = 90.42 
Age of participants (months):	Mean = 521.84, SD = 2.19, Range = 514- 533
Other sweep and/or cohort:	• NSHD (Age 53, 60-64, 68-70)* • NCDS (Age 50, 62)* • BCS70 (Age 46)* * Only included 1 trial
Source:	The letter cancellation test was adapted from the MRC Cognitive Function and Ageing Study (MRC CFA Study, 1998).
Technical resources:	None
Example articles:	• Richards, M., Kuh, D., Hardy, R., & Wadsworth, M. (1999). Lifetime cognitive function and timing of the natural menopause. *Neurology, 53*(2), 308-308. • Richards, M., Hardy, R., Kuh, D., & Wadsworth, M. E. (2001). Birth weight and cognitive function in the British 1946 birth cohort: longitudinal population based study. *BMJ, 322*(7280), 199-203.

2.5.5 Motor Speed and Praxis

NSHD Age 43 (1989): Motor Speed and Praxis	
Domain:	Motor skills

NSHD Age 43 (1989): Motor Speed and Praxis	
Measures:	Psychomotor speed Manual dexterity Coordination Control precision Aiming
CHC:	Gp (psychomotor abilities)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1989 (Age 43)
Administration method:	Research nurse; face to face; physical task
Procedure:	Participants were presented with a set of pegs that were placed in holes on one side of a wooden board. They were then timed as they moved 10 the pegs from one hole to an adjacent hole on the opposite side. Five trials were conducted for each hand (10 trials total).
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1989_a_main.pdf
Scoring:	Mean speed across the five trials are available for each hand. A log transformed version of the mean scores are also available.
Item-level variable(s):	PGL189-PGR589
Total score/derived variable(s):	PEG89
Descriptives:	Raw score: N = 3,163 Range = 77-516 Mean = 104.49 SD = 15.62

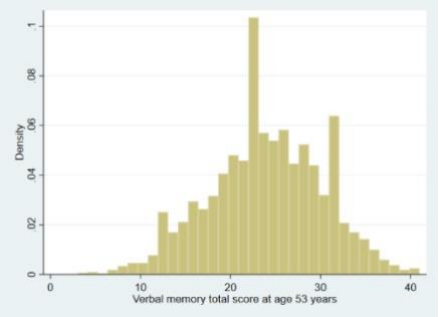
NSHD Age 43 (1989): Motor Speed and Praxis	
	
Age of participants (months):	Mean = 521.84, SD = 2.19, Range = 514-533
Other sweep and/or cohort:	None
Source:	This task was developed specifically for this study. Similar manual dexterity tasks have been used as screeners for manual dexterity difficulties since the 1940s, e.g. Tiffin and Asher (1948).
Technical resources:	None
Example articles:	• Richards, M., Hardy, R., & Wadsworth, M. E. (2004). Alcohol consumption and midlife cognitive change in the British 1946 birth cohort study. *Alcohol and Alcoholism, 40*(2), 112-117. • Richards, M., & Wadsworth, M. E. J. (2004). Long term effects of early adversity on cognitive function. *Archives of Disease in Childhood, 89*(10), 922-927.

2.6 NSHD Age 53 (1999)

2.6.1 Verbal Learning/Word List Recall Test

NSHD Age 53 (1999): Verbal Learning/Word List Recall Test	
Domain:	Verbal (memory)

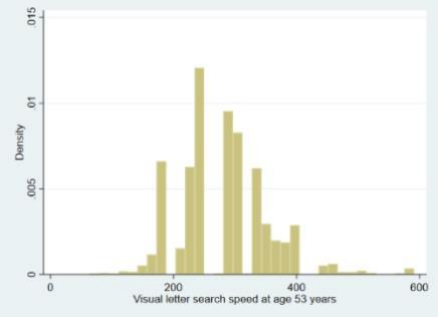
NSHD Age 53 (1999): Verbal Learning/Word List Recall Test	
Measures:	Verbal memory Attention Short-term episodic memory Free-recall memory
CHC:	Glr (Long-Term Storage and Retrieval)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1999 (Age 53)
Administration method:	Research nurse; face to face computer-assisted personal interview (CAPI); pen and paper
Procedure:	Same as for age 43, however, a delayed recall condition was also added; participants were asked to recall the words again after the letter search task (an interval of approximately 90 seconds). A different word list was given to each half of the cohort at 43 years and these lists were reversed when they were at 53 years of age, to minimize any practice effects.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1999-capi.pdf
Scoring:	A point was awarded for every correct word recalled (0-45 [immediate]; 0-15 [delayed]).
Item-level variable(s):	wlin199 – wltx99
Total score/derived variable(s):	WLT99
Descriptives:	Raw score: N = 2,887 Range = 3-41 Mean = 23.93 SD = 6.30

NSHD Age 53 (1999): Verbal Learning/Word List Recall Test	
	
Age of participants (months):	Mean = 641.47, SD = 2.09, Range = 636-650
Other sweep and/or cohort:	• NCDS (Age 50, 62)* • BCS70 (Age 46-47)* • NSHD (Age 43, 60-64, 68-70) *1 trial only; 10 words, presented aurally.
Source:	This task was developed specifically for this study by the NSHD team led by Prof Bryan Rodgers. Similar tasks have been used to measure verbal learning for decades, e.g. Bush and Mosteller (1955).
Technical resources:	None
Example articles:	• Richards, M., Hardy, R., & Wadsworth, M. E. (2004). Alcohol consumption and midlife cognitive change in the British 1946 birth cohort study. *Alcohol and Alcoholism, 40*(2), 112-117. • Richards, M., Shipley, B., Fuhrer, R., & Wadsworth, M. E. (2004). Cognitive ability in childhood and cognitive decline in mid-life: longitudinal birth cohort study. *BMJ, 328*(7439), 552.

2.6.2 Timed Letter Search/Letter Cancellation Test

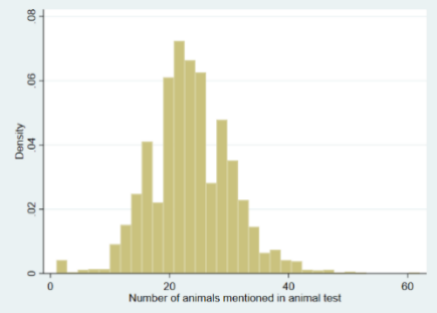
NSHD Age 53 (1999): Timed Letter Search/Letter Cancellation Test	
Domain:	Processing speed
Measures:	Attention/concentration Mental speed Visual scanning

NSHD Age 53 (1999): Timed Letter Search/Letter Cancellation Test	
CHC:	Gv (Visual Processing) Gs (Processing Speed)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1999 (Age 53)
Administration method:	Research nurse; face to face computer-assisted personal interview (CAPI); pen and paper
Procedure:	Similar to NSHD age 43, only 1 trial was given. Moreover, the letters covered a full page, so that a maximal score was obtained, which may have been restricted at age 43 due to the shorter blocks of letters.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1999-capi.pdf
Scoring:	The number of hits, misses and row/column reached were recorded, meaning multiple scoring schemes are possible. Although there is no definitive scoring system used, the most widely adopted approach is to calculate speed (number of letters scanned) and accuracy (dividing the number of missed targets for each trial by the corresponding speed score).
Item-level variable(s):	vscl99 – vsrw99
Total score/derived variable(s):	CANSP99
Descriptives:	Raw data of accuracy score: N = 2,932 Range = 64-591 Mean = 281.07 SD = 76.09

NSHD Age 53 (1999): Timed Letter Search/Letter Cancellation Test	
	
Age of participants (months):	Mean = 641.47, SD = 2.09, Range = 636 - 650
Other sweep and/or cohort:	• NSHD (Age 43, 60 -64, 68 - 70) • NCDS (Age 50, 61 - 63) • BCS70 (Age 46)
Source:	The letter cancellation test was adapted from the MRC Cognitive Function and Ageing Study (MRC CFA Study, 1998).
Technical resources:	None
Example articles:	• Richards, M., Kuh, D., Hardy, R., & Wadsworth, M. (1999). Lifetime cognitive function and timing of the natural menopause. *Neurology, 53*(2), 308-308. • Richards, M., Hardy, R., Kuh, D., & Wadsworth, M. E. (2001). Birth weight and cognitive function in the British 1946 birth cohort: longitudinal population based study. *BMJ, 322*(7280), 199-203.

2.6.3 Verbal Fluency (Animal Naming) Test

NSHD Age 53 (1999): Verbal Fluency (Animal Naming) Test	
Domain:	Verbal fluency
Measures:	Verbal/semantic fluency Associational fluency Executive function
CHC:	Glr (Long-Term Storage and Retrieval)

NSHD Age 53 (1999): Verbal Fluency (Animal Naming) Test	
CLOSER Source:	Explore this sweep in Discovery: NSHD 1999 (Age 53)
Administration method:	Research nurse; face to face computer-assisted personal interview (CAPI); read aloud
Procedure:	Participants were asked to name as many different animals as possible within a one-minute timeframe. The interviewer made a note of each named animal and entered the total number into the CAPI programme. Repetitions, named animals (e.g. Bambi), and redundancies (e.g. white cat, black cat) were not included in the total score.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1999-capi.pdf
Scoring:	Total number of animals named.
Item-level variable(s):	None
Total score/derived variable(s):	anin Explore these variables in Discovery: NSHD 1999 Main Home Visit Dataset
Descriptives:	Raw data: N = 2,949 Range = 1-62 Mean = 23.56 SD = 6.91 
Age of participants (months):	Mean = 641.47, SD = 2.09, Range = 636-650

NSHD Age 53 (1999): Verbal Fluency (Animal Naming) Test	
Other sweep and/or cohort:	• NCDS (Age 50, 62) • BCS70 (Age 46-47)
Source:	Taken from Section B (cognitive assessment) of the Cambridge Mental Disorders of the Elderly Examination (CAMDEX) (Roth et al., 1986).
Technical resources:	None
Example articles:	• Hatch, S. L., Feinstein, L., Link, B. G., Wadsworth, M. E., & Richards, M. (2007). The continuing benefits of education: adult education and midlife cognitive ability in the British 1946 birth cohort. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 62*(6), S404-S414. • Murray, G. K., Jones, P. B., Kuh, D., & Richards, M. (2007). Infant developmental milestones and subsequent cognitive function. *Annals of Neurology, 62*(2), 128-136.

2.6.4 Prospective Memory

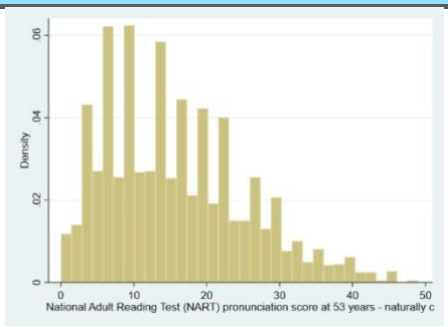
NSHD Age 53 (1999): Prospective Memory	
Domain:	Verbal memory
Measures:	Prospective memory
CHC:	None
CLOSER Source:	Explore this sweep in Discovery: NSHD 1999 (Age 53)
Administration method:	Research nurse; face to face computer-assisted personal interview (CAPI); pen and paper; read aloud
Procedure:	Respondents were told that that, later in the interview, they would be given an envelope and asked to write a name and address on it, at which point they should remember to turn it over, seal it, and write their initials on it. After the animal naming task, the interviewer handed the participant an envelope and asked them to write down the name John Brown, 42 West Street, Bedford.

NSHD Age 53 (1999): Prospective Memory	
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1999-capi.pdf
Scoring:	A 3-point ordinal variable was constructed as follows: Both actions completed correctly, without prompting (score of 3) Only one action completed, without prompting (score of 2) No actions completed, without prompting (score of 1)
Item-level variable(s):	None
Total score/derived variable(s):	Remem Explore these variables in Discovery: NSHD 1999 Main Home Visit Dataset.
Descriptives:	Frequencies: • Both actions completed correctly, without prompting (N = 2,431) • One action completed, without prompting (N = 310) • No action completed, without prompting (N = 184)
Age of participants (months):	Mean = 641.47, SD = 2.09, Range = 636-650
Other sweep and/or cohort:	None
Source:	Developed specifically for the study.
Technical resources:	None
Example articles:	None found.

2.6.5 National Adult Reading Test (NART)

NSHD Age 53 (1999): National Adult Reading Test (NART)	
Domain	Verbal (reading)

NSHD Age 53 (1999): National Adult Reading Test (NART)	
Measures:	Knowledge acquisition Correlates highly with IQ Used to estimate premorbid cognitive ability Reading decoding
CHC:	Gc (Crystallized intelligence) Grw (Reading/writing)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1999 (Age 53)
Administration method:	Research nurse; face to face computer-assisted personal interview (CAPI); read aloud
Procedure:	Participants were asked to read aloud a list of 50 words that increased in difficulty. The words were 'irregular'; i.e. they do not conform to common rules of pronunciation. This was to minimise the likelihood that successful pronunciation was due to intelligent guesswork rather than previous knowledge of the word in question. For example, 'naïve' might be pronounced as 'nave' without any prior knowledge of the word. The interviewer recorded the number of errors (mispronounced words). This score was then inverted by subtracting the number of errors from 50, in order to be consistent with the direction of scoring of other measures administered at this age.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1999-capi.pdf
Scoring:	Number of errors inverted (0-50)
Item-level variable(s):	Not currently available
Total score/derived variable(s):	nart99
Descriptives:	N = 2,825 Range = 0-49 Mean = 15.69 SD = 9.54

NSHD Age 53 (1999): National Adult Reading Test (NART)	
	
Age of participants (months):	Mean = 641.47, SD = 2.09, Range = 636-650
Other sweep and/or cohort:	None
Source:	Nelson, H. E., & Willison, J. (1991). National Adult Reading Test (NART). Windsor: Nfer-Nelson.
Technical resources:	None
Example articles:	• Richards, M., & Sacker, A. (2003). Lifetime antecedents of cognitive reserve. *Journal of Clinical and Experimental Neuropsychology, 25*(5), 614-624. • Davies, G., Tenesa, A., Payton, A., Yang, J., Harris, S. E., Liewald, D., ... & McGhee, K. (2011). Genome-wide association studies establish that human intelligence is highly heritable and polygenic. *Molecular Psychiatry, 16*(10), 996.

2.6.6 Delayed Verbal Memory

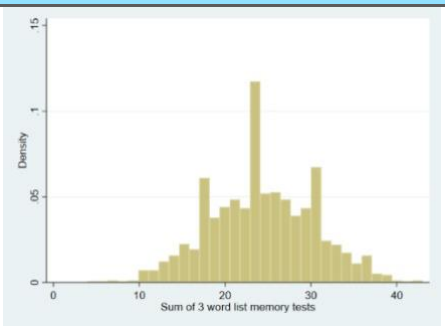
NSHD Age 53 (1999): Delayed Verbal Memory	
Domain:	Verbal (memory)
Measures:	Delayed verbal memory
CHC:	Glr (Long-Term Storage and Retrieval)
CLOSER Source:	Explore this sweep in Discovery: NSHD 1999 (Age 53)
Administration method:	Research nurse; face to face computer-assisted personal interview (CAPI); spoken aloud

NSHD Age 53 (1999): Delayed Verbal Memory	
Procedure:	After the NART was administered (which followed directly after the envelope task) participants were asked to recall, without prior prompting, the name and address they previously wrote on the envelope.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:1999-capi.pdf
Scoring:	A maximum score of 6 was achievable, with one point given for each element of the address e.g.: (i) John (ii) Brown, (iii) 42 (iv) West (v) Street, (vi) Bedford
Item-level variable(s):	naadta1, naadta2, naadta3, naadta4, naadta5, naadta6 Explore these variables in Discovery: NSHD 1999 Main Home Visit Dataset.
Total score/derived variable(s):	None
Descriptives:	None
Age of participants (months):	Mean = 641.47, SD = 2.09, Range = 636-650
Other sweep and/or cohort:	None
Source:	Developed specifically for the study.
Technical resources:	None
Example articles:	None found.

2.7 NSHD Age 60-64 (2006-2010)

2.7.1 Verbal Learning/Word List Recall Test

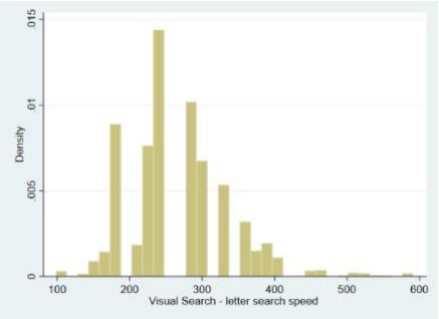
NSHD Age 60-64 (2006-2010): Verbal Learning/Word List Recall Test	
Domain:	Verbal (memory)
Measures:	Attention Short-term episodic memory Verbal memory Free-recall memory
CHC:	Glr (Long-Term Storage and Retrieval)
CLOSER Source:	Explore this sweep in Discovery: NSHD 2006-2010 (Age 60-64)
Administration method:	Research nurse; face to face; pen and paper
Procedure:	Same procedure as NSHD age 53
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:2008_nurse.pdf
Scoring:	A point was awarded for every correct word recalled (0-45 [immediate]; 0-15[delayed])
Item-level variable(s):	WLE109 – WLTD09
Total score/derived variable(s):	WLT09
Descriptives:	Raw data: N = 2,150 Range = 4-43 Mean = 24.26 SD = 6.11

NSHD Age 60-64 (2006-2010): Verbal Learning/Word List Recall Test	
	
Age of participants (months):	Mean = 760.24, SD = 13.36, Range = 724-780
Other sweep and/or cohort:	• NCDS (Age 50, 62)* • BCS70 (Age 46-47)* • NSHD (Age 43, 53, 68-70) * 1 trial only; 10 words, presented aurally.
Source:	This task was developed specifically for this study by the NSHD team led by Prof Bryan Rodgers. Similar tasks have been used to measure verbal learning for decades, e.g. Bush and Mosteller (1955).
Technical resources:	None
Example articles:	• Hurst, L., Stafford, M., Cooper, R., Hardy, R., Richards, M., & Kuh, D. (2013). Lifetime socioeconomic inequalities in physical and cognitive aging. *American Journal of Public Health, 103*(9), 1641-1648. • James, S. N., Davis, D., O'Hare, C., Sharma, N., John, A., Gaysina, D., ... & Richards, M. (2018). Lifetime affective problems and later-life cognitive state: Over 50 years of follow-up in a British birth cohort study. *Journal of Affective Disorders, 241*, 348-355.

2.7.2 Timed Letter Search/Letter Cancellation Test

NSHD Age 60-64 (2006-2010): Timed Letter Search/Letter Cancellation Test	
Domain:	Processing speed

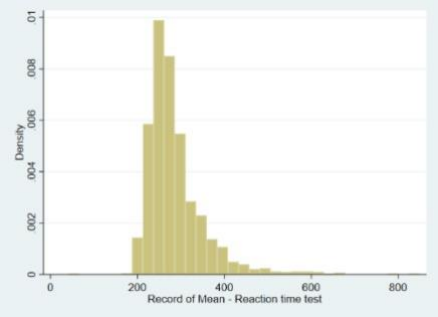
NSHD Age 60-64 (2006-2010): Timed Letter Search/Letter Cancellation Test	
Measures:	Attention/concentration Mental speed Visual scanning
CHC:	Gv (Visual Processing) Gs (Processing Speed)
CLOSER Source:	Explore this sweep in Discovery: NSHD 2006-2010 (Age 60-64)
Administration method:	Research nurse; face to face; pen and paper
Procedure:	Same as at NSHD age 53
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:2008_nurse.pdf
Scoring:	The number of hits, misses and row/column reached were recorded, meaning multiple scoring schemes are possible. Although there is no definitive scoring system used, the most widely adopted approach is to calculate speed (number of letters scanned) and/or accuracy (dividing the number of missed targets for each trial by the corresponding speed score).
Item-level variable(s):	VSCL09 – VSRWN09
Total score/derived variable(s):	VSP09

NSHD Age 60-64 (2006-2010): Timed Letter Search/Letter Cancellation Test	
Descriptives:	Raw data of accuracy score: N = 2,182 Range = 98-591 Mean = 266.71 SD = 71.74 
Age of participants (months):	Mean = 760.24, SD = 13.36, Range = 724-780
Other sweep and/or cohort:	• NSHD (Age 43, 53, 68-70) • NCDS (Age 50, 62) • BCS70 (Age 46)
Source:	The letter cancellation test adapted from the MRC Cognitive Function and Ageing Study (MRC CFA Study, 1998).
Technical resources:	None
Example articles:	• Hurst, L., Stafford, M., Cooper, R., Hardy, R., Richards, M., & Kuh, D. (2013). Lifetime socioeconomic inequalities in physical and cognitive aging. *American Journal of Public Health, 103*(9), 1641-1648. • Masi, S., Georgiopoulos, G., Khan, T., Johnson, W., Wong, A., Charakida, M., ... & Deanfield, J. (2018). Patterns of adiposity, vascular phenotypes and cognitive function in the 1946 British Birth Cohort. *BMC Medicine, 16*(1), 75.

2.7.3 Reaction Time Test

NSHD Age 60-64 (2006-2010): Reaction Time Test	
Domain:	Reaction time

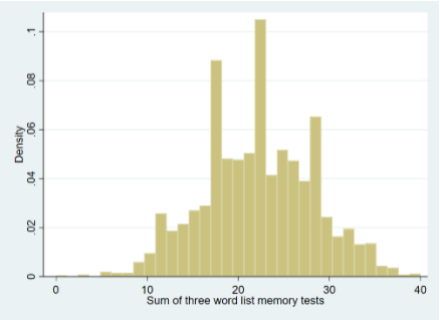
NSHD Age 60-64 (2006-2010): Reaction Time Test	
Measures:	Simple reaction time (task 1) Choice reaction time (task 2)
CHC:	Gt (reaction and decision speed)
CLOSER Source:	Explore this sweep in Discovery: NSHD 2006-2010 (Age 60-64)
Administration method:	Research nurse; face to face; computer-assisted personal interview (CAPI)
Procedure:	Task 1: Using the CAPI, participants were instructed to press a key as quickly as possible every time the numbers '0' or '8' appeared on screen. Participants were instructed to use 1 finger only. There were delays of 1-3 seconds between each letter, to avoid anticipation. The test began with 8 practice trials. For the full test, a total of 20 trials were completed. Task 2: Next, the participants were instructed that the numbers '1', '2', '3', and '4' would appear on screen, and they were to press the corresponding keys as quickly as possible; i.e. if a '1' appeared, they were to press '1'. They were instructed to use both hands. Again, there were 8 practice trials, and the full test consisted of 40 trials.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:2000_nurse.pdf
Scoring:	Mean reaction time of correct trials.
Item-level variable(s):	K0ER09 – K4SD09
Total score/derived variable(s):	RTMN09, RTSD09 Explore these variables in Discovery: NSHD 2006-10 Nurse Dataset
Descriptives:	Mean reaction time: N = 2,167 Range = 41-849 Mean = 286.11 SD = 68.48

NSHD Age 60-64 (2006-2010): Reaction Time Test	
	
Age of participants (months):	Mean = 760.24, SD = 13.36, Range = 724-780
Other sweep and/or cohort:	None
Source:	Generic reaction time test. Similar reaction time tests have been widely used in psychology for well over a century, e.g. Cattell (1890).
Technical resources:	Masi, S., Georgiopoulos, G., Khan, T., Johnson, W., Wong, A., Charakida, M., ... & Deanfield, J. (2018). Patterns of adiposity, vascular phenotypes and cognitive function in the 1946 British Birth Cohort. *BMC Medicine, 16*(1), 75. https://doi.org/10.1186/s12916-018-1059-x
Example articles:	• Masi, S., Georgiopoulos, G., Khan, T., Johnson, W., Wong, A., Charakida, M., ... & Deanfield, J. (2018). Patterns of adiposity, vascular phenotypes and cognitive function in the 1946 British Birth Cohort. *BMC Medicine, 16*(1), 75. https://doi.org/10.1186/s12916-018-1059-x

2.8 NSHD Age 68-70 (2014-2016)

2.8.1 Verbal Learning/Word List Recall Test

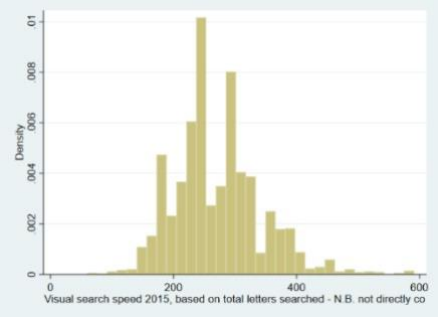
NSHD Age 68-70 (2014-2016): Verbal Learning/Word Recall Test	
Domain:	Verbal (memory)

NSHD Age 68-70 (2014-2016): Verbal Learning/Word Recall Test	
Measures:	Attention Short-term episodic memory Verbal memory Free-recall memory
CHC:	Glr (Long-Term Storage and Retrieval)
CLOSER Source:	Explore this sweep in Discovery: NSHD 2014 (Age 68) and 2015 (Age 69).
Administration method:	Research nurse; face to face computer-assisted personal interview (CAPI); pen and paper
Procedure:	As in NSHD sweeps age 53 and 60-64 years.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:2015_capi.pdf
Scoring:	One point was awarded for each correctly remembered word (0-45).
Item-level variable(s):	WLE115x – WLT315x
Total score/derived variable(s):	WLT15x
Descriptives:	Raw score: N = 2,074 Range = 0-40 Mean = 22.17 SD = 6.07 

NSHD Age 68-70 (2014-2016): Verbal Learning/Word Recall Test	
Age of participants (months):	Mean = 834.14, SD = 2.93, Range = 828-848
Other sweep and/or cohort:	• NCDS (Age 50, 62)* • BCS70 (Age 46-47)* • NSHD (Age 43, 53, 60 -64) *1 trial only; 10 words, presented aurally.
Source:	This task was developed specifically for this study by the NSHD team. Similar tasks have been used to measure verbal learning for decades, e.g. Bush and Mosteller (1955).
Technical resources:	None
Example articles:	• Proitsi, P., Kuh, D., Wong, A., Maddock, J., Bendayan, R., Wulaningsih, W., ... & Richards, M. (2018). Lifetime cognition and late midlife blood metabolites: findings from a British birth cohort. *Translational Psychiatry, 8*(1), 203. • Tsui, A., Kuh, D., Richards, M., & Davis, D. (2018). Delirium symptoms are associated with decline in cognitive function between ages 53 and 69 years: findings from a British birth cohort study. *Alzheimer's & Dementia, 14*(5), 617-622.

2.8.2 Timed Letter Search/Letter Cancellation Test

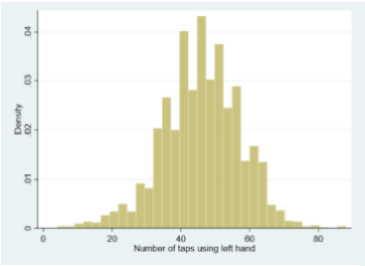
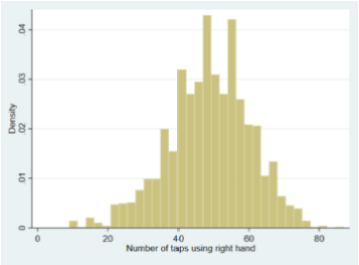
NSHD Age 68-70 (2014-2016): Timed Letter Search/Latter Cancellation Test	
Domain:	Processing speed
Measures:	Attention/concentration Mental speed Visual scanning
CHC:	Gv (Visual Processing) Gs (Processing Speed)
CLOSER Source:	Explore this sweep in Discovery: NSHD 2014 (Age 68) and 2015 (Age 69).

NSHD Age 68-70 (2014-2016): Timed Letter Search/Latter Cancellation Test	
Administration method:	Research nurse; face to face computer-assisted personal interview (CAPI); pen and paper
Procedure:	As in NSHD sweeps age 53 and 60 -64 years.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:2015_capi.pdf
Scoring:	The number of hits, misses and row/column reached were recorded, meaning multiple scoring schemes are possible. Although there is no definitive scoring system used, the most widely adopted approach is to calculate speed (number of letters scanned) and/or accuracy (dividing the number of missed targets for each trial by the corresponding speed score).
Item-level variable(s):	VSCFLAG15x – VSRWTOT15x
Total score/derived variable(s):	VSP15x, VSPTOT15x
Descriptives:	Accuracy score: N = 2,114 Range = 60-591 Mean = 270.04 SD = 72.60 
Age of participants (months):	Mean = 834.14, SD = 2.93, Range = 828-848

NSHD Age 68-70 (2014-2016): Timed Letter Search/Latter Cancellation Test	
Other sweep and/or cohort:	• NSHD (Age 43, 53, 60-64) • NCDS (Age 50, 62) • BCS70 (Age 46)
Source:	The letter cancellation test adapted from the MRC Cognitive Function and Ageing Study (MRC CFA Study, 1998).
Technical resources:	None
Example articles:	• Proitsi, P., Kuh, D., Wong, A., Maddock, J., Bendayan, R., Wulaningsih, W., ... & Richards, M. (2018). Lifetime cognition and late midlife blood metabolites: findings from a British birth cohort. *Translational Psychiatry, 8*(1), 203. • Tsui, A., Kuh, D., Richards, M., & Davis, D. (2018). Delirium symptoms are associated with decline in cognitive function between ages 53 and 69 years: findings from a British birth cohort study. *Alzheimer's & Dementia, 14*(5), 617-622.

2.8.3 Finger Tapping Test

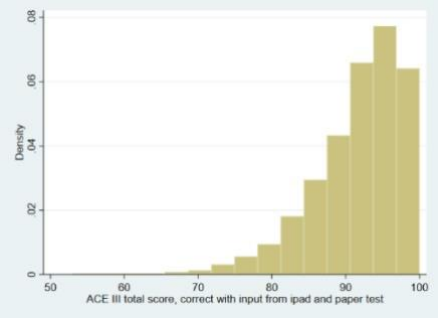
NSHD Age 68-70 (2014-2016): Finger Tapping Test	
Domain:	Non-verbal
Measures:	Psychomotor speed/fluidity Finger dexterity
CHC:	Psychomotor Speed (Gps)
CLOSER Source:	Explore this sweep in Discovery: NSHD 2014 (Age 68) and 2015 (Age 69)
Administration method:	Research nurse; face to face computer-assisted personal interview (CAPI); physical task
Procedure:	With their palm down and fingers extended, participants were asked to tap a lever with their index finger as fast as possible for 10 seconds. They were asked to do this once with their right hand and once with their left.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=questionnaires:2015_capi.pdf

NSHD Age 68-70 (2014-2016): Finger Tapping Test	
Scoring:	Number of taps per hand (0-88).
Item-level variable(s):	TAP15x
Total score/derived variable(s):	TAPLF15x, TAPRF15x
Descriptives:	Raw score (left hand): N = 2,052 (left hand) Range = 4-88 Mean = 45.98 SD = 11.32  Raw score (right hand): N = 2,050 (right hand) Range = 9-87 Mean = 48.78 SD = 11.69 
Age of participants (months):	Mean = 834.14, SD = 2.93, Range = 828-848
Other sweep and/or cohort:	None

NSHD Age 68-70 (2014-2016): Finger Tapping Test	
Source:	Reitan, R. M., & Wolfson, D. (1985). *The Halstead-Reitan neuropsychological test battery: Theory and clinical interpretation* (Vol. 4). Reitan Neuropsychology.
Technical resources:	Dumont, R., Willis, J. O., Viezel, K., & Zibulsky, J. (2013). Halstead-Reitan Neuropsychological Test Battery. *Encyclopedia of Special Education: A Reference for the Education of Children, Adolescents, and Adults with Disabilities and Other Exceptional Individuals*.
Example articles:	• Morrison, M. W., Gregory, R. J., & Paul, J. J. (1979). Reliability of the Finger Tapping Test and a note on sex differences. Perceptual and Motor Skills, 48(1), 139-142. • Arnold, G., Boone, K. B., Lu, P., Dean, A., Wen, J., Nitch, S., & McPherson, S. (2005). Sensitivity and specificity of finger tapping test scores for the detection of suspect effort. The Clinical Neuropsychologist, 19(1), 105-120.

2.8.4 Addenbrooke's Cognitive Examination-III (ACE-III): Total Score

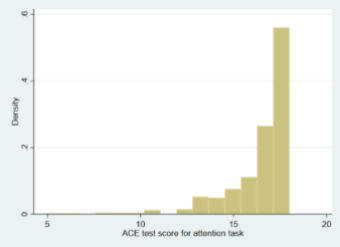
NSHD Age 68-70 (2014-2016): ACE-III: Total Score	
Domain:	Verbal and non-verbal ability
Measures:	Attention/Orientation Memory Language Verbal Fluency Visuospatial Skills
CHC:	G (general ability)
CLOSER Source:	Explore this sweep in Discovery: NSHD 2014 (Age 68) and 2015 (Age 69)
Administration method:	Administered by a research nurse. Mostly conducted using the ACEmobile app, installed on an iPad, with prompts to guide interviewer through the process. Pen and paper used where necessary (e.g. drawing tests).

NSHD Age 68-70 (2014-2016): ACE-III: Total Score	
Procedure:	The ACE-III was designed to detect mild dementia and distinguish between Alzheimer's disease (AD) and Frontotemporal dementia (FTD) (Mathuranath et al., 2000). Although it may be considered a measure of general cognitive ability, it was developed as a screen for impairment for use in clinical settings. It contains tasks/questions that measure 5 different cognitive domains: attention and orientation (scored 0 - 18); verbal fluency (0 - 14); memory (0 - 26); language (0 - 26); and visuospatial function (0 - 16). The tasks/questions used to assess the 5 specific domains are outlined separately in the next sections. Responses from the 5 domains can be summed to create an overall cognitive functioning score (0 - 100). ACE-III was administered by the interviewers via iPad using ACEmobile (http://www.acemobile.org). Where this was not possible, a paper version was used. All offline scoring was undertaken by trained personnel.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=mrepo:ace-iii.pdf
Scoring:	One mark per correct item (0-100)
Item-level variable(s):	ACESCRAT15x – ACEVISIOTOT15x
Total score/derived variable(s):	ACETOTFIN15x, MINIACE15x
Descriptives:	Raw score: N = 1,762 Range = 53-100 Mean = 91.52 SD = 6.01 

NSHD Age 68-70 (2014-2016): ACE-III: Total Score	
Age of participants (months):	Mean = 834.14, SD = 2.93, Range = 828-848
Other sweep and/or cohort:	None
Source:	Mathuranath, P. S., Nestor, P. J., Berrios, G. E., Rakowicz, W., & Hodges, J. R. (2000). A brief cognitive test battery to differentiate Alzheimer's disease and frontotemporal dementia. *Neurology, 55*(11), 1613-1620.
Technical resources:	Noone, P. (2015). Addenbrooke's cognitive examination-III. *Occupational Medicine, 65*(5), 418-420. https://doi.org/10.1093/occmed/kqv041
Example articles:	• Matías-Guiu, J. A., Valles-Salgado, M., Rognoni, T., Hamre-Gil, F., Moreno-Ramos, T., & Matías-Guiu, J. (2017). Comparative diagnostic accuracy of the ACE-III, MIS, MMSE, MoCA, and RUDAS for screening of Alzheimer Disease. *Dementia and Geriatric Cognitive Disorders, 43*(5-6), 237-246. • James, S. N., Davis, D., O'Hare, C., Sharma, N., John, A., Gaysina, D., ... & Richards, M. (2018). Lifetime affective problems and later-life cognitive state: Over 50 years of follow-up in a British birth cohort study. *Journal of Affective Disorders, 241*, 348-355.

2.8.5 ACE-III: Attention/Orientation Scale

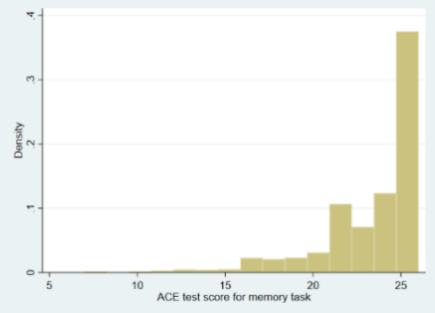
NSHD Age 68-70 (2014-2016): ACE-III: Attention/Orientation Scale	
Domain:	Verbal orientation
Measures:	Attention Orientation
CHC:	Q1 - 3: Glr (long term storage and retrieval) Q4: Counting backwards - Gs (processing speed)
CLOSER Source:	Explore this sweep in Discovery: NSHD 2014 (Age 68) and 2015 (Age 69)

NSHD Age 68-70 (2014-2016): ACE-III: Attention/Orientation Scale	
Administration method:	Administered by a research nurse. Mostly conducted using ACEmobile app, installed on an iPad, with prompts to guide interviewer through the process. Pen and paper used where necessary (e.g. drawing tests).
Procedure:	Participants were asked to: i) State the day, date, month, year and season (0 - 5) ii) State the floor/no., street/hospital, town, county and country (0 - 5) iii) Repeat the three words "lemon", "key" and "ball" directly after interviewer (0 - 3) i) Count backwards from 100 in 7s (0 - 5; stops after 5 subtractions)
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=mrepo:ace-iii.pdf
Scoring:	One point per correct answer (0-18)
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	ACESCRAT15x
Descriptives:	Raw data: N = 1,786 Range = 5-18 Mean = 16.72 SD = 1.85 
Age of participants (months):	Mean = 834.14, SD = 2.93, Range = 828-848
Other sweep and/or cohort:	None

NSHD Age 68-70 (2014-2016): ACE-III: Attention/Orientation Scale	
Source:	Mathuranath, P. S., Nestor, P. J., Berrios, G. E., Rakowicz, W., & Hodges, J. R. (2000). A brief cognitive test battery to differentiate Alzheimer's disease and frontotemporal dementia. *Neurology, 55*(11), 1613-1620.
Technical resources:	Noone, P. (2015). Addenbrooke's cognitive examination-III. *Occupational Medicine, 65*(5), 418-420. https://doi.org/10.1093/occmed/kqv041
Example articles:	• James, S. N., Davis, D., O'Hare, C., Sharma, N., John, A., Gaysina, D., ... & Richards, M. (2018). Lifetime affective problems and later-life cognitive state: Over 50 years of follow-up in a British birth cohort study. Journal of Affective Disorders, 241, 348-355. • Matías-Guiu, J. A., Valles-Salgado, M., Rognoni, T., Hamre-Gil, F., Moreno-Ramos, T., & Matías-Guiu, J. (2017). Comparative diagnostic accuracy of the ACE-III, MIS, MMSE, MoCA, and RUDAS for screening of Alzheimer Disease. Dementia and Geriatric Cognitive Disorders, 43(5-6), 237-246.

2.8.6 ACE-III: Memory

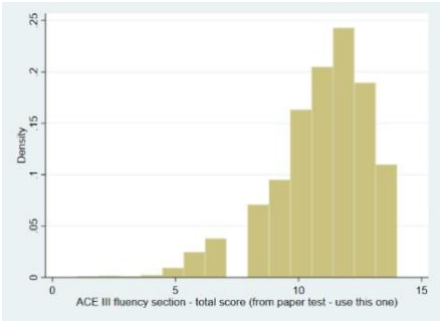
NSHD Age 68-70 (2014-2016): ACE-III: Memory	
Domain:	Verbal memory
Measures:	Memory
CHC:	Gc (Crystallised Intelligence) Glr (long-term storage and retrieval)
CLOSER Source:	Explore this sweep in Discovery: NSHD 2014 (Age 68) and 2015 (Age 69)
Administration method:	Administered by a research nurse. Mostly conducted using ACEmobile app, installed on an iPad, with prompts to guide interviewer through the process. Pen and paper used where necessary (e.g. drawing tests).

NSHD Age 68-70 (2014-2016): ACE-III: Memory	
Procedure:	After the attention section was completed, participants were asked to recall the three words they were asked to remember (“lemon”, “key” and “ball”; 0 - 3). Participants were then asked to memorise an address consisting of 7 elements. They were given two practice trials, and a third trial took place later in the interview; this was the only trial that was scored (0 - 7). Thosewho remembered all 7 elements of the address were given an additional 5 points. Those who got at least one element of the address wrong were then given primers to help them recall the correct elements (0 - 5). They were then asked to name: (i) the current Prime Minister; (ii) the first woman who was Prime Minister; (iii) the USA president; (iv) the USA president who was assassinated in the 1960 (0 - 4).
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=mrepo:ace-iii.pdf
Scoring:	One point per correct answer (0-26)
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	ACESCRMM15x
Descriptives:	Raw score: N = 1,787 Range = 7-26 Mean = 23.46 SD = 2.86 

NSHD Age 68-70 (2014-2016): ACE-III: Memory	
Age of participants (months):	Mean = 834.14, SD = 2.93, Range = 828-848
Other sweep and/or cohort:	None
Source:	Mathuranath, P. S., Nestor, P. J., Berrios, G. E., Rakowicz, W., & Hodges, J. R. (2000). A brief cognitive test battery to differentiate Alzheimer's disease and frontotemporal dementia. *Neurology, 55*(11), 1613-1620.
Technical resources:	Noone, P. (2015). Addenbrooke's cognitive examination-III. *Occupational Medicine, 65*(5), 418-420. https://doi.org/10.1093/occmed/kqv041
Example articles:	• Matías-Guiu, J. A., Valles-Salgado, M., Rognoni, T., Hamre-Gil, F., Moreno-Ramos, T., & Matías-Guiu, J. (2017). Comparative diagnostic accuracy of the ACE-III, MIS, MMSE, MoCA, and RUDAS for screening of Alzheimer Disease. Dementia and Geriatric Cognitive Disorders, 43(5-6), 237-246. • James, S. N., Davis, D., O'Hare, C., Sharma, N., John, A., Gaysina, D., ... & Richards, M. (2018). Lifetime affective problems and later-life cognitive state: Over 50 years of follow-up in a British birth cohort study. Journal of Affective Disorders, 241, 348-355.

2.8.7 ACE-III: Fluency

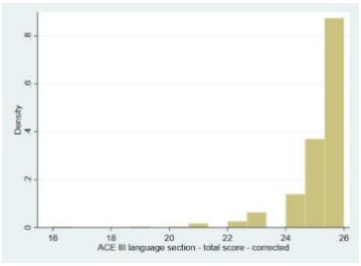
NSHD Age 68-70 (2014-2016): ACE-III: Fluency	
Domain	Verbal fluency
Measures:	Verbal fluency
CHC:	Glr (Long-Term Storage and Retrieval)
CLOSER Source:	Explore this sweep in Discovery: NSHD 2014 (Age 68) and 2015 (Age 69)
Administration method:	Administered by a research nurse. Mostly conducted using ACEmobile app, installed on an iPad, with prompts to guide interviewer through the process. Pen and paper used where necessary (e.g. drawing tests).
Procedure:	In one minute, participants were asked to name as many words as

NSHD Age 68-70 (2014-2016): ACE-III: Fluency	
	possible beginning with a specific letter (excluding the names of people and countries). Next, they were given one minute to name as many animals as possible.
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=mrepo:ace-iii.pdf
Scoring:	0 - 14 (number of responses grouped into 7 categories, e.g. 0 - 1 items named = 0 points, 2 - 3 items named = 1 point, etc.).
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	ACEFLU15x
Descriptives:	Raw score: N = 2,101 Range = 1-14 Mean = 11.00 SD = 2.11 
Age of participants (months):	Mean = 834.14, SD = 2.93, Range = 828-848
Other sweep and/or cohort:	None
Source:	Mathuranath, P. S., Nestor, P. J., Berrios, G. E., Rakowicz, W., & Hodges, J. R. (2000). A brief cognitive test battery to differentiate Alzheimer's disease and frontotemporal dementia. *Neurology, 55*(11), 1613-1620.
Technical resources:	Noone, P. (2015). Addenbrooke's cognitive examination-III. *Occupational Medicine, 65*(5), 418-420. https://doi.org/10.1093/occmed/kqv041
Example articles:	• Matías-Guiu, J. A., Valles-Salgado, M., Rognoni, T., Hamre-Gil, F., Moreno-Ramos, T., & Matías-Guiu, J. (2017). Comparative diagnostic

NSHD Age 68-70 (2014-2016): ACE-III: Fluency	
	accuracy of the ACE-III, MIS, MMSE, MoCA, and RUDAS for screening of Alzheimer Disease. *Dementia and Geriatric Cognitive Disorders, 43*(5-6), 237-246. • James, S. N., Davis, D., O'Hare, C., Sharma, N., John, A., Gaysina, D., ... & Richards, M. (2018). Lifetime affective problems and later-life cognitive state: Over 50 years of follow-up in a British birth cohort study. *Journal of Affective Disorders, 241*, 348-355.

2.8.8 ACE-III: Language Test

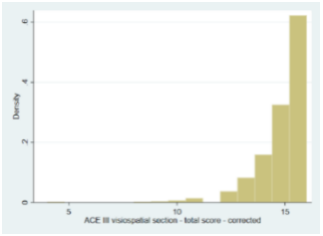
NSHD Age 68-70 (2014-2016): ACE-III: Language Test	
Domain:	Verbal (language ability)
Measures:	Language comprehension Lexical knowledge
CHC:	Gc (Crystallized Intelligence)
CLOSER Source:	Explore this sweep in Discovery: NSHD 2014 (Age 68) and 2015 (Age 69)
Administration method:	Administered by a research nurse. Mostly conducted using ACEmobile app, installed on an iPad, with prompts to guide interviewer through the process. Penand paper used where necessary (e.g. drawing tests).
Procedure:	First, participants were handed a pencil and paper and asked to follow three commands: i) "Place the paper on top of the pencil", ii) "Pick up the pencil but not the paper", iii) "Ask the subject to "Pass me the pencil after touching the paper" (0 - 3). Second, they were asked to write two complete sentences about their last holiday/weekend/Christmas (0 - 2). Third, they were asked to repeat the words: 'caterpillar'; 'eccentricity; 'unintelligible'; 'statistician' (0 - 2). Fourth, they were asked to repeat the saying 'All that glitters is not gold' (0 - 1). Fifth, they were asked to repeat the saying 'A stitch in time saves nine' (0 - 1). Sixth, they were shown 12 pictures and asked to name them (0 - 12).

NSHD Age 68-70 (2014-2016): ACE-III: Language Test	
	Seventh, they were asked to point to certain pictures, e.g. “Which picture relates to the monarchy” (0 - 4). Finally, they were asked to read aloud 5 irregular words, e.g. ‘sew’, ‘pint’ (0 - 1).
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=mrepo:ace-iii.pdf
Scoring:	One or two points per correct answer (0-26).
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	ACELANGTOT15x
Descriptives:	Raw score: N = 1,765 Range = 16-26 Mean = 25.27 SD = 1.17 
Age of participants (months):	Mean = 834.14, SD = 2.93, Range = 828-848
Other sweep and/or cohort:	None
Source:	Mathuranath, P. S., Nestor, P. J., Berrios, G. E., Rakowicz, W., & Hodges, J. R. (2000). A brief cognitive test battery to differentiate Alzheimer's disease and frontotemporal dementia. *Neurology, 55*(11), 1613-1620.
Technical resources:	Noone, P. (2015). Addenbrooke’s cognitive examination-III. *Occupational Medicine, 65*(5), 418-420. https://doi.org/10.1093/occmed/kqv041

NSHD Age 68-70 (2014-2016): ACE-III: Language Test	
Example articles:	• Matías-Guiu, J. A., Valles-Salgado, M., Rognoni, T., Hamre-Gil, F., Moreno-Ramos, T., & Matías-Guiu, J. (2017). Comparative diagnostic accuracy of the ACE-III, MIS, MMSE, MoCA, and RUDAS for screening of Alzheimer Disease. *Dementia and Geriatric Cognitive Disorders, 43*(5-6), 237-246. • James, S. N., Davis, D., O'Hare, C., Sharma, N., John, A., Gaysina, D., ... & Richards, M. (2018). Lifetime affective problems and later-life cognitive state: Over 50 years of follow-up in a British birth cohort study. *Journal of Affective Disorders, 241*, 348-355.

2.8.9 ACE-III: Visuospatial Skills

NSHD Age 68-70 (2014-2016): ACE-III: Visuospatial Skills	
Domain:	Non-verbal ability
Measures:	Visuospatial skills
CHC:	Gv (Visual processing)
CLOSER Source:	Explore this sweep in Discovery: NSHD 2014 (Age 68) and 2015 (Age 69)
Administration method:	Administered by a research nurse. Mostly conducted using ACEmobile app, installed on an iPad, with prompts to guide interviewer through the process. Pen and paper used where necessary (e.g. drawing tests).
Procedure:	Participants were asked to: i) Copy two objects (0 - 3) ii) Draw a clock with numbers and hands indicating the time as ten minutes past five (0 - 5) iii) Count the number of dots in 4 separate pictures (0 -4) iv) Identify 4 partially complete letters (0 - 4)
Link to questionnaire:	https://skylark.ucl.ac.uk/NSHD/lib/exe/fetch.php?media=mrepo:ace-iii.pdf
Scoring:	0-16
Item-level variable(s):	Not currently available.

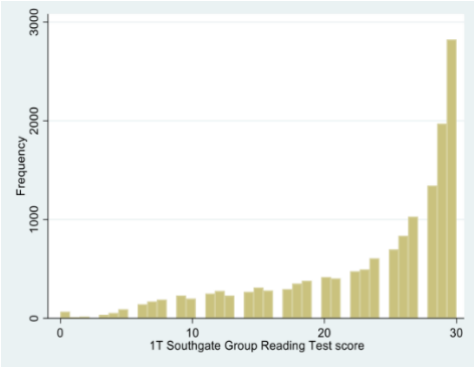
NSHD Age 68-70 (2014-2016): ACE-III: Visuospatial Skills	
Total score/derived variable(s):	ACEVISIOTOT15x
Descriptives:	Raw score: N = 1,778 Range = 4-16 Mean = 15.05 SD = 1.29 
Age of participants (months):	Mean = 834.14, SD = 2.93, Range = 828-848
Other sweep and/or cohort:	None
Source:	Mathuranath, P. S., Nestor, P. J., Berrios, G. E., Rakowicz, W., & Hodges, J. R. (2000). A brief cognitive test battery to differentiate Alzheimer's disease and frontotemporal dementia. *Neurology, 55*(11), 1613-1620.
Technical resources:	Noone, P. (2015). Addenbrooke's cognitive examination-III. *Occupational Medicine, 65*(5), 418-420. https://doi.org/10.1093/occmed/kqv041
Example articles:	• Matías-Guiu, J. A., Valles-Salgado, M., Rognoni, T., Hamre-Gil, F., Moreno-Ramos, T., & Matías-Guiu, J. (2017). Comparative diagnostic accuracy of the ACE-III, MIS, MMSE, MoCA, and RUDAS for screening of Alzheimer Disease. *Dementia and Geriatric Cognitive Disorders, 43*(5-6), 237-246. • James, S. N., Davis, D., O'Hare, C., Sharma, N., John, A., Gaysina, D., ... & Richards, M. (2018). Lifetime affective problems and later-life cognitive state: Over 50 years of follow-up in a British birth cohort study. *Journal of Affective Disorders, 241*, 348-355.

3. National Child Development Study (NCDS)

3.1 NCDS Age 7 (1965)

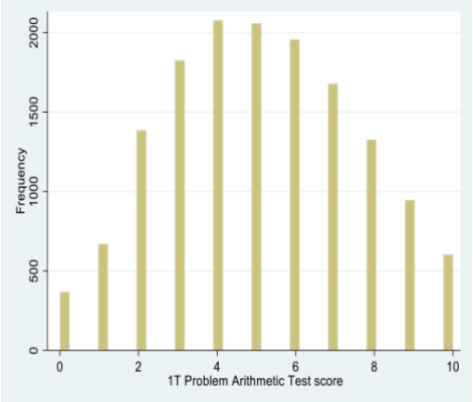
3.1.1 Southgate Group Reading Test (SGRT)

NCDS Age 7 (1965): Southgate Group Reading Test (SGRT)	
Domain:	Verbal (reading)
Measures:	Reading ability (word recognition and comprehension) Particularly suited to identifying children with reading difficulties.
CHC:	Gc (Crystallised ability) Grw (Reading/writing)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 7 Survey (1965).
Administration method:	Teacher at school in a group; face to face; read aloud and by the child
Procedure:	On 16 (of 30) occasions, the child was given a picture of an object and had to ring the word, from 5 different options describing that object in the picture. On the other 14 occasions, the teacher read out a word and the child had to circle the correct one. Duration: The test lasted approximately 15-20 minutes (expected 60 -90 minutes for all 4 tests at age 7).
Link to questionnaire:	No direct link to pdf. Information can be found in the file 'ncds1_1965_questionnaires_and_codebook.pdf/' which accompanies data download from UK Data Service website.
Scoring:	30 items. Each correct answer receives one mark. The total of possible marks for the test is 30.
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	N92 Explore these variables in Discovery: NCDS1 Tests (1965) Dataset
Age of participants (months):	Mean = 85.11, SD = 1.56, Range = 82 - 93
Descriptives:	Raw data: N = 14,929 Range = 0 - 30 Mean = 23.34

NCDS Age 7 (1965): Southgate Group Reading Test (SGRT)	
	SD = 7.14 
Other sweep and/or cohort:	None
Source:	Southgate, V. (1962). Southgate Group Reading Tests: Manual of Instructions. University of London Press
Technical resources:	• Shepherd, P. *Measures of ability at ages 7 to 16.* National Child Development Study User Guide, 2012. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS-user-guide-NCDS1-3-Measures-of-ability-P-Shepherd-December-2012.pdf • Pringle, M. K., Butler, N. & Davie, R. (1966). *11,000 Seven Year Olds*. Longman, in association with National Children's Bureau
Example articles:	• Currie, J., & Thomas, D. (1999). Early test scores, socioeconomic status and future outcomes (No. w6943). National bureau of economic research. • Richards, M., Power, C., & Sacker, A. (2009). Paths to literacy and numeracy problems: evidence from two British birth cohorts. Journal of Epidemiology & Community Health, 63(3), 239-244.

3.1.2 Problem Arithmetic Test

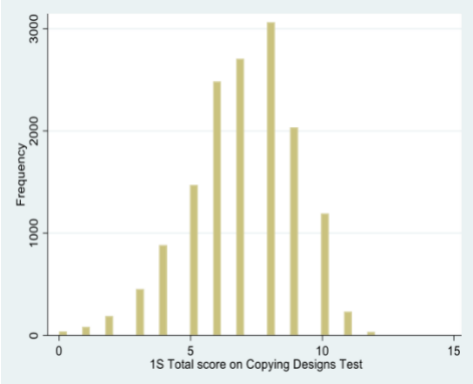
NCDS Age 7 (1965): Problem Arithmetic Test	
Domain:	Arithmetic (arithmetic problems)
Measures:	Arithmetic
CHC:	Gq (Quantitative Knowledge)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 7 Survey (1965).

NCDS Age 7 (1965): Problem Arithmetic Test	
Administration method:	Teacher at school; face to face; self-completion. However, if necessary, each problem was read to the child if there was difficulty in reading the items.
Procedure:	Ten arithmetic problems graded in level of difficulty. In order to avoid penalising the poor readers, the teachers were asked to read the problems to the children if necessary. The test was discontinued after three successive incorrect answers. Duration: It was expected 60 - 90 minutes would be required for all 4 tests at age 7.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/ncds1.pdf
Scoring:	One mark was awarded for each correct answer, giving a score between 0 and 10.
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	N90 Explore these variables in Discovery: NCDS1 Tests (1965) Dataset
Age of participants (months):	Mean = 85.11, SD = 1.56, Range = 82 - 93
Descriptives:	Raw data: N = 14,897 Range = 0 - 10 Mean = 5.11 SD = 2.49 
Other sweep and/or cohort:	None

NCDS Age 7 (1965): Problem Arithmetic Test	
Source:	The individual items were chosen in the main from a large number previously used by the National Foundation for Educational Research, so that information was available on their facility values and it was possible to select those items which on a 7-year-old population would produce a normal distribution of scores.
Technical resources:	• Shepherd, P. *Measures of ability at ages 7 to 16.* National Child Development Study User Guide, 2012. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS-user-guide-NCDS1-3-Measures-of-ability-P-Shepherd-December-2012.pdf • Pringle, M. K., Butler, N. & Davie, R. (1966). *11,000 Seven Year Olds*. Longman, in association with National Children's Bureau
Example articles:	• Feinstein, L. (2004). Mobility in pupils' cognitive attainment during school life. *Oxford Review of Economic Policy*, *20*(2), 213- 229. • Case, A., & Paxson, C. (2008). Stature and status: Height, ability, and labor market outcomes. *Journal of Political Economy*, *116*(3), 499-532. • Sullivan, A. (2009). Academic self-concept, gender and single- • sex schooling. *British Educational Research Journal*, *35*(2), 259- 288.

3.1.3 Copying Designs Test (CDT)

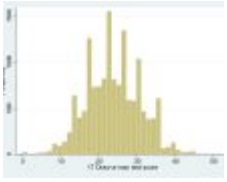
NCDS Age 7 (1965): Copying Designs Test (CDT)	
Domain:	Visual spatial
Measures:	Visual motor co-ordination (ability to reproduce shapes and hold a pencil)
CHC:	Gv (Visual Processing)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 7 Survey (1965).
Administration method:	Teacher at school; face to face; pen and paper
Procedure:	Six designs were presented: a circle, square, triangle, diamond, cross and star. The child was given a booklet, and asked to copy the 6 drawings, one at a time. Duration: It was expected 60 -90 minutes would be required for all 4 tests at age 7.

NCDS Age 7 (1965): Copying Designs Test (CDT)	
Link to questionnaire:	No direct link to pdf. Information can be found in the file 'ncds1_1965_questionnaires_and_codebook.pdf/' which accompanies the data download from UK Data Service website.
Scoring:	Score 0 - 12. Each drawing is scored 0 or 1. As not all children completed two copies a score of 1 was given if at least one copy was good. Total score is the sum of the score for the individual drawings. Zero was awarded when a child attempted to copy at least one design, but all attempts were judged to be poor copies.
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	N457 Explore these variables in Discovery: NCDS1 Tests (1965) Dataset.
Age of participants (months):	Mean = 85.11, SD = 1.56, Range = 82 - 93
Descriptives:	N = 14,867 Range = 0 - 12 Mean = 7.01 SD = 2.00 
Other sweep and/or cohort:	• NCDS (age 11) • BCS70 (age 5; less stringent scoring; 8 designs) • BCS70 (children of cohort member, multi-age; 8 designs); currently no data available)
Source:	Pringle, M. K., Butler, N. & Davie, R. (1966). *11,000 Seven Year Olds*. Longman, in association with National Children's Bureau. Davie, R., Butler, N. R., & Goldstein, H. (1972). *From Birth to Seven.* London: Longman Group Limited

NCDS Age 7 (1965): Copying Designs Test (CDT)	
Technical resources:	Shepherd, P., *Measures of ability at ages 7 to 16.* National Child Development Study User Guide, 2012. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS-user-guide-NCDS1-3-Measures-of-ability-P-Shepherd-December-2012.pdf
Example articles:	• Sheridan, M. D. (1973). Children of seven years with marked speech defects. *International Journal of Language & Communication Disorders*, *8*(1), 9-16. • Ross, A., Schoon, I., Martin, P., & Sacker, A. (2009). Family and nonfamily role configurations in two British cohorts. *Journal of* • *Marriage and Family*, *71*(1), 1-14.

3.1.4 Human Figure Drawing (HFD)

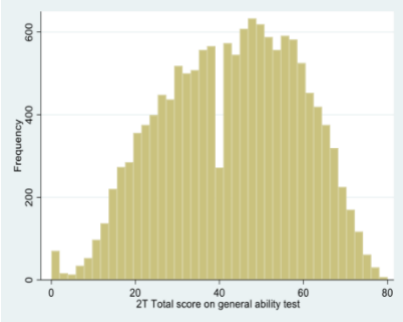
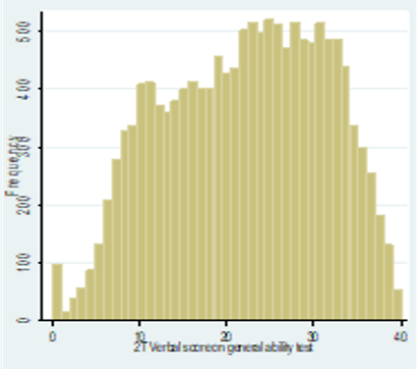
NCDS Age 7 (1965): Human Figure Drawing (HFD)	
Domain:	General ability (perceptual)
Measures:	General mental and perceptual ability. Purports to measure cognitive maturation.
CHC:	Gv (Visual Processing)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 7 Survey (1965).
Administration method:	Teacher at school; face to face; pen and paper
Procedure:	The child was asked to 'make a picture of a man', within the rectangular frame. They were asked to make the best picture they could and to draw a whole person, not just a face or head. Duration: (expected 60 - 90 minutes for all 3 tests at age 7)
Link to questionnaire:	No direct link to pdf. Information can be found in the file 'ncds1_1965_questionnaires_and_codebook.pdf/' which accompanies data download from UK Data Service website.
Scoring:	Awarded a mark out of 100 according to the features that were included.
Item-level variable(s):	Not currently available.
Total score/derived	N1840 Explore these variables in Discovery: NCDS1 Tests (1965) Dataset.

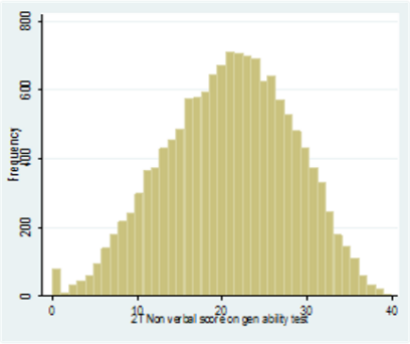
NCDS Age 7 (1965): Human Figure Drawing (HFD)	
variable(s):	
Age of participants (months):	Mean = 85.11, SD = 1.56, Range = 82 - 93
Descriptives:	N = 14,642 Range = 0 - 53 Mean = 23.84 SD = 7.08 
Other sweep and/or cohort:	• BCS70 (age 5) – (different scoring system)
Source:	• Modified version of the 'Draw-a-man' test (Goodenough, 1926) and later developed by Harris (1963). • Goodenough, F. L. (1926). The measurement of intelligence by drawings, New York: World Book Company. • Harris, D. B. (1963). Children's drawings as measures of intellectual maturity, New York: Harcourt, Brace and World. • Scoring was based on: Koppitz, E M. (1968). Psychological Evaluation of Children's Human Figure Drawings. New York: Grune and Stratton
Technical resources:	Shepherd, P. Measures of ability at ages 7 to 16. National Child Development Study User Guide, 2012. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS-user-guide-NCDS1-3-Measures-of-ability-P-Shepherd-December-2012.pdf
Example articles:	• Schoon, I., Bynner, J., Joshi, H., Parsons, S., Wiggins, R. D., & Sacker, A. (2002). The influence of context, timing, and duration of risk experiences for the passage from childhood to midadulthood. *Child development*, *73*(5), 1486-1504. • Schoon, I., & Parsons, S. (2002). Competence in the face of adversity: the influence of early family environment and long- term consequences. *Children & society*, *16*(4), 260-272.

3.2 NCDS Age 11 (1969)

3.2.1 General Ability Test (Verbal and Non-Verbal)

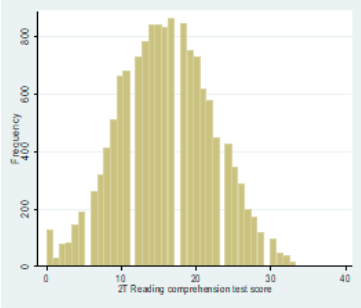
NCDS Age 11 (1969): General Ability Test (Verbal and Non-Verbal)	
Domain:	Verbal (reasoning) Non-verbal (reasoning)
Measures:	Measure of general ability, including verbal and non-verbal elements. Douglas (1964) claims the test correlates highly with IQ-type tests used for secondary school selection.
CHC:	G (General ability) Gc (Crystallised) Gf (Fluid)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 11 Survey 1969.
Administration method:	Teacher at school; face to face; pen and paper
Procedure:	The test consisted of 80 multiple choice questions. Before the test was administered the child was shown four examples which the child and teacher completed together. For the verbal items the child was presented with an example set of four words that were linked either logically, semantically or phonologically; for the non-verbal test, fours example shapes or symbols were used. Next to the examples were three word or shapes/symbols with a blank, along with 5 response options to choose from. From the list, the child was required to underline the missing item which completed the sequence. Duration: 30 minutes
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2018/05/NCDS2-Guide-to-the-Dataset.pdf
Scoring:	80 items in total; 40 verbal and 40 non-verbal. Each correct answer given 1 mark and 0 for incorrect answer. Total score ranges from 0 to 80, verbal and non-verbal subscales (0 to 40).
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	• n914 (verbal) • n917 (non-verbal) • n920 (general ability)
Age of participants (months):	Mean = 134.25, SD = 1.70, Range = 130 - 152

NCDS Age 11 (1969): General Ability Test (Verbal and Non-Verbal)	
Descriptives:	General ability: N = 14,131 Range = 0 - 80 Mean = 42.94 SD = 16.14  Verbal ability: N = 14,131 Range = 0 - 40 Mean = 22.06 SD = 9.36  Non-verbal ability: N = 14,131 Range = 0 - 40 Mean = 20.88 SD = 7.61

NCDS Age 11 (1969): General Ability Test (Verbal and Non-Verbal)	
	
Other sweep and/or cohort:	• NSHD (age 11)
Source:	Pigeon DA. Details of the fifteen years tests. Appendix 1 in Douglas, J.W.B., The Home and the School: A study of ability and attainment in the primary school. 1964, London: MacGibbon and Kee.
Technical resources:	Shepherd, P. Measures of ability at ages 7 to 16. National Child Development Study User Guide, 2012. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS-user-guide-NCDS1-3-Measures-of-ability-P-Shepherd-December-2012.pdf
Example articles:	• Galindo-Rueda, F., & Vignoles, A. (2005). The declining relative importance of ability in predicting educational attainment. *Journal of Human Resources*, *40*(2), 335-353. • Schoon, I., Cheng, H., Gale, C. R., Batty, G. D., &Deary, I. J. (2010). Social status, cognitive ability, and educational attainment as predictors of liberal social attitudes and political trust. *Intelligence*, *38*(1), 144-150.

3.2.2 Reading Comprehension Test

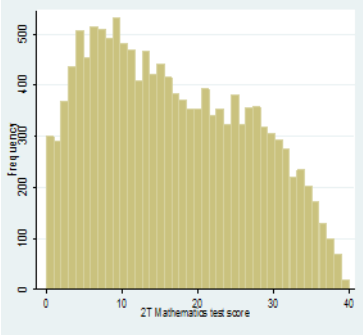
NCDS Age 11 (1969): Reading Comprehension Test	
Domain:	Verbal (reading)
Measures:	Reading comprehension
CHC:	Gc (Crystallised) Grw (Reading/Writing)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 11 Survey 1969.
Administration method:	Teacher at school; individually face to face; pen and paper

	NCDS Age 11 (1969): Reading Comprehension Test
Procedure:	The test consisted of 35 sentences. Before the test was administered the child was shown two examples which the child and teacher completed together. The child was required to read a sentence and choose from a selection of 5 words the most appropriate to complete the sentence. From the list, the child was required to underline the missing item which completed the sentence. Duration: 20 minutes
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2018/05/NCDS2-Guide-to-the-Dataset.pdf
Scoring:	35 items. Each correct answer receives one mark. The total of possible marks for the test is 35.
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	N923
Age of participants (months):	Mean = 134.25, SD = 1.70, Range = 130 - 152
Descriptives:	N = 14,130 Range = 0 - 35 Mean = 15.98 SD = 6.29 
Other sweep and/or cohort:	• NCDS (age 16) • NSHD (age 8, 15 and 26)
Source:	Constructed by National Federation for Educational Research (NFER) specifically for use in the NCDS. The test was designed to parallel the Watts-Vernon test of reading ability (Watts-Vernon, 1947).
Technical	Shepherd, P. *Measures of ability at ages 7 to 16.* National Child

NCDS Age 11 (1969): Reading Comprehension Test	
resources:	Development Study User Guide, 2012. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS-user-guide-NCDS1-3-Measures-of-ability-P-Shepherd-December-2012.pdf
Example articles:	• Butler, N. R., & Goldstein, H. (1973). Smoking in pregnancy and subsequent child development. *BMJ*, *4*(5892), 573-575. • Blanden, J., Gregg, P., & Macmillan, L. (2006). *Accounting for intergenerational income persistence: non-cognitive skills, ability and education.* CEEDP (73). Centre for the Economics of Education, London School of Economics and Political Science, London, UK. ISBN 07530 2084 X

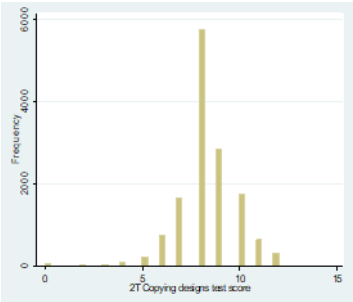
3.2.3 Mathematics Test

NCDS Age 11 (1969): Mathematics Test	
Domain:	Arithmetic
Measures:	Arithmetic
CHC:	Gq (Quantitative Knowledge)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 11 Survey 1969.
Administration method:	Teacher at school; individually face to face; pen and paper
Procedure:	The test consisted of 40 items. The test included number skills, fractions, measures and geometry. Most questions were calculated directly, with a few involving multiple-choice answers.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2018/05/NCDS2-Guide-to-the-Dataset.pdf
Scoring:	One mark was awarded for each correct answer
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	n926
Age of participants	Mean = 134.25, SD = 1.70, Range = 130 - 152

NCDS Age 11 (1969): Mathematics Test	
(months):	
Descriptives:	N = 14,126 Range = 0 - 40 Mean = 16.63 SD = 10.35 
Other sweep and/or cohort:	None
Source:	Constructed by National Foundation for Educational Research (NFER) specifically for use in the NCDS.
Technical resources:	Shepherd, P., Measures of ability at ages 7 to 16. National Child Development Study User Guide, 2012.
Example articles:	• Cherlin, A. J., Furstenberg, F. F., Chase-Lansdale, L., Kiernan, K. E., Robins, P. K., Morrison, D. R., & Teitler, J. O. (1991). Longitudinal studies of effects of divorce on children in Great Britain and the United States. *Science*, *252*(5011), 1386-1389. • Gregg, P., & Macmillan, L. (2010). Family income, education and cognitive ability in the next generation: exploring income gradients in education and test scores for current cohorts of youth. *Longitudinal and Life Course Studies*, *1*(3), 259-280.

3.2.4 Copying Designs Test (CDT)

NCDS Age 11 (1969): Copying Designs Test (CDT)	
Domain:	Visual spatial
Measures:	Visual motor co-ordination Ability to reproduce shapes

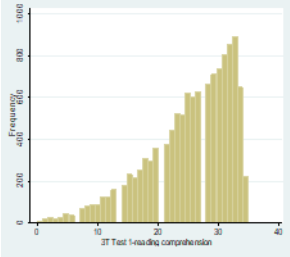
NCDS Age 11 (1969): Copying Designs Test (CDT)	
CHC:	Gv (Visual Processing)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 11 Survey 1969.
Administration method:	Teacher at school; individually face to face; pen and paper
Procedure:	Six designs were presented: a circle, square, triangle, diamond, cross and star. The child was given a booklet, and asked to copy 6 drawings, one at a time.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2018/05/NCDS2-Guide-to-the-Dataset.pdf
Scoring:	Score 0 - 12. Each drawing is scored 0 or 1. As not all children completed two copies a score of 1 was given if at least one copy is good. Total score is the sum of the score for the individual drawings. Zero was awarded when a child attempted to copy at least one design, but all attempts were judged to be poor copies.
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	n929
Age of participants (months):	Mean = 134.25, SD = 1.70, Range = 130 - 152
Descriptives:	N = 14,101 Range = 0 - 12 Mean = 8.34 SD = 1.50 
Other sweep and/or cohort:	• NCDS (age 7) • BCS70 (age 5; less stringent scoring; 8 designs) • BCS70 (children of cohort member, multi-age; 8 designs; currently

NCDS Age 11 (1969): Copying Designs Test (CDT)	
	no data available)
Source:	Pringle, M. K., Butler, N., & Davie, R. (1966). *11,000 Seven Year Olds*. Longman, in association with National Children's Bureau.
Technical resources:	Shepherd, P. *Measures of ability at ages 7 to 16.* National Child Development Study User Guide, 2012. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS-user-guide-NCDS1-3-Measures-of-ability-P-Shepherd-December-2012.pdf
Example articles:	• Jenkins, A., Vignoles, A., Wolf, A., & Galindo-Rueda, F. (2003). The determinants and labour market effects of lifelong learning. *Applied economics*, *35*(16), 1711-1721. • Lynn, R., & Kanazawa, S. (2011). A longitudinal study of sex differences in intelligence at ages 7, 11 and 16 years. *Personality and Individual Differences*, *51*(3), 321-324.

3.3 NCDS Age 16 (1974)

3.3.1 Reading Comprehension Test

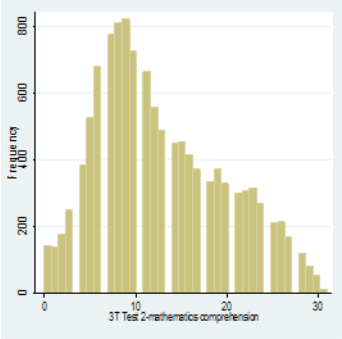
NCDS Age 16 (1974): Reading Comprehension Test	
Domain:	Verbal (reading)
Measures:	Reading comprehension
CHC:	Gc (Crystallised) Grw (Reading/Writing)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 16 Survey (1974).
Administration method:	Teacher at school; individually face to face; pen and paper
Procedure:	The test consisted of 35 sentences. Before the test was administered the child was shown two examples which the child and teacher completed together. The child was required to read a sentence and choose from a selection of 5 words the most appropriate to complete the sentence. From the list, the child was required to underline the missing item which completed the sentence. The test was conducted under timed conditions and within time-limit. Duration: 10 minutes

NCDS Age 16 (1974): Reading Comprehension Test	
Link to questionnaire:	No direct link to pdf. Information can be found in the file 'ncds3_1974_questionnaires_and_codebook.pdf' which accompanies data download from UK Data Service website.
Scoring:	35 items. Each correct answer receives one mark. The total of possible marks for the test is 35.
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	n2928
Age of participants (months):	Mean = 192.52, SD = 1.36, Range = 190 - 201
Descriptives:	N = 11,986 Range = 0 - 35 Mean = 25.31 SD = 7.09 
Other sweep and/or cohort:	• NCDS (age 11) • NSHD (age 8, 15 and 26)
Source:	Used in NCDS age 11: Constructed by National Foundation for Educational Research (NFER) specifically for use in the NCDS. The test was designed to parallel the Watts-Vernon test of reading ability (Watts-Vernon, 1947).
Technical resources:	Shepherd, P. *Measures of ability at ages 7 to 16.* National Child Development Study User Guide, 2012. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS-user-guide-NCDS1-3-Measures-of-ability-P-Shepherd-December-2012.pdf
Example articles:	• Goodman, A., & Sianesi, B. (2005). Early education and children's outcomes: how long do the impacts last? Fiscal Studies, 26(4), 513-548. • Power, C., Li, L., & Hertzman, C. (2008). Cognitive development and

NCDS Age 16 (1974): Reading Comprehension Test	
	cortisol patterns in mid-life: findings from a British birth cohort. Psychoneuroendocrinology, 33(4), 530-539.

3.3.2 Mathematics Test

NCDS Age 16 (1974): Mathematics Test	
Domain:	Mathematics
Measures:	Mathematics. Numerical and geometric skills.
CHC:	Gq (Quantitative Knowledge)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 16 Survey (1974)
Administration method:	Teacher at school; individually face to face; pen and paper
Procedure:	The test consisted of 31 items. The test included, number skills and geometry using 27 multiple-choice and 4 true or false questions. Duration: The test was conducted under timed conditions and within time-limit (45 minutes)
Link to questionnaire:	No direct link to pdf. Information can be found in the file 'ncds3_1974_questionnaires_and_codebook.pdf' which accompanies data download from UK Data Service website.
Scoring:	31 items, each correct answer received one mark. The total of possible marks for the test was 31.
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	n2930
Age of participants (months):	Mean = 192.52, SD = 1.36, Range = 190 - 201
Descriptives:	N = 11,920 Range = 0 -31 Mean = 12.76 SD = 7.00

NCDS Age 16 (1974): Mathematics Test	
	
Other sweep and/or cohort:	None
Source:	Constructed by National Foundation for Educational Research (NFER) specifically for use in the NCDS.
Technical resources:	Shepherd, P., Measures of ability at ages 7 to 16. National Child Development Study User Guide, 2012. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS-user-guide-NCDS1-3-Measures-of-ability-P-Shepherd-December-2012.pdf
Example articles:	• Fogelman, K. (1978). School attendance, attainment and behaviour. British journal of educational psychology, 48(2), 148-158. • Jeffers, B. J., Power, C., & Hertzman, C. (2002). Birth weight, childhood socioeconomic environment, and cognitive development in the 1958 British birth cohort study. BMJ, 325(7359), 305.

3.4 NCDS Mother and Child Study (cohort member's child, multi-age; 1991)

The child assessments included in the NCDS5 Child Interview (conducted when the Cohort Member (CM) was aged 33) applied only to the natural or adopted children of CMs aged 3 years, 11 months, and 16 days or older. Some 3,575 (71%) of the CMs' children identified were eligible for the Child Interview. The tests were based on those used by the US National Longitudinal Survey of Youth (NLSY) for their 1990 survey of the children of female respondents. These tests were developed in the US and a number of changes (mainly substituting terminology) were made to individual assessments for use in the NCDS.

Prior to administering all of these tests, the interviewer calculated the Peabody Picture Vocabulary Test (PPVT) age of the child (actual age rounded up or down to the nearest

whole month) to establish if the child was eligible for testing, which tests would be administered and, for some tests, the appropriate starting point of the test.

Time at start and completion (24-hour clock) was calculated using the following variables: n520128 n520130 n521935 n521937.

3.4.1 Peabody Picture Vocabulary Test – Revised (PPVT-R)

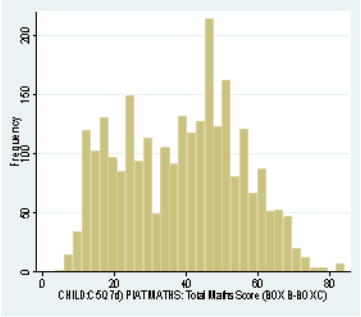
NCDS Mother and Child Study (CM child; 1991): Peabody Picture Vocabulary Test – Revised (PPVT-R)	
Domain:	Verbal (vocabulary)
Measures:	Hearing vocabulary Word knowledge
CHC:	Gc (Crystallised intelligence)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 33 Survey (1991)
Administration method:	Interviewer at home; face to face; read and point at picture
Procedure:	The interviewer said a word and the child pointed to one of four pictures which best portrayed the meaning of the word. The difficulty level increased as the child goes through the test. The interviewer: • identified the start point (using the PPVT) • established basal (8 correct answers in a row) and ceiling (6 out of 8 responses wrong) points. If the child did not get the first 8 items correct, then they worked backwards until 8 consecutive correct items were identified. If the child got back to item 1 then this became the basal. The ceiling was identified when 6 out of 8 items were incorrect or if item 175 was reached.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/Ncds5d.pdf
Scoring:	See source materials
Item-level variable(s):	• n520132 (starting item) • n520135 – n520762 (items 1 – 175, correct and response) • n520813 (basal obtained Y/N) • n520814 (ceiling obtained Y/N) • n520124 n520126 (PPVT age in years and months) Explore these variables in Discovery: NCDS5 Child (1991) Dataset

NCDS Mother and Child Study (CM child; 1991): Peabody Picture Vocabulary Test – Revised (PPVT-R)	
Total score/derived variable(s):	No derived variables
Age of participants (months):	Mean = 103.31, SD = 36.89, Range = 47 – 224
Descriptives:	Not available (see technical resources on deriving scores)
Other sweep and/or cohort:	• EPVT in BCS70 (age 5) - English version • PLCT in BCS70 (age 10) - based on EPVT at age 5
Source:	Dunn, L. & Dunn, L. (1981). PPVT-R Manual (Circle Pines, MN American Guidance Service)
Technical resources:	For further details see: Baker, P. C. and Mott F.L. (1993). NLSY Child Handbook: A Guide to the 1986-1990 National Longitudinal Survey of Youth Child Data. Revised Edition. Columbus, Ohio Center for Human Resource Research, The Ohio State University. https://www.nlsinfo.org/sites/default/files/attachments/121214/ChildHandbook1990%20part%201.pdf
Example articles:	• Michael, R. (2003). Children's cognitive skill development in Britain and the United States. *International Journal of Behavioral Development*, *27*(5), 396-408. • Armstrong, A. (2012). Belief in a just world and children's cognitive scores. *National Institute Economic Review*, *222*(1), R7-R19. • Parcel, T. L., & Campbell, L. A. (2017). Can the welfare state replace parents? Children's cognition in the United States and Great Britain. *Social Science Research*, *64*, 79-95.

3.4.2 Peabody Individual Achievement Test (PIAT) Maths

NCDS Mother and Child Study (CM child; 1991): PIAT Maths	
Domain:	Mathematics
Measures:	Mathematics achievement. Covers a wide range from early skills, such as recognising numerals, and progresses to measuring more advanced concepts in geometry and trigonometry.
CHC:	Gq (Quantitative Knowledge)

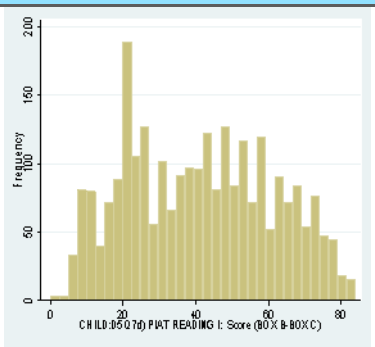
NCDS Mother and Child Study (CM child; 1991): PIAT Maths	
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 33 Survey (1991).
Administration method:	Interviewer at home; face to face; read and child selects
Procedure:	Consists of 84 multiple-choice items of increasing difficulty. The interviewer read out the question and the child selected an answer from one of four. The interviewer: • identified the start point (using the PPVT age) • established basal (5 correct answers in a row) and ceiling (5 out of 7 responses wrong) points. If the child does not get the first 5 items correct, then they work backwards from the next lower age. The ceiling is identified when 5 out of 7 items are incorrect or if item 84 is reached.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/Ncds5d.pdf
Scoring:	Last item (out of 84) reached on test (ceiling) minus the total number of incorrect responses (see source materials for further details)
Item-level variable(s):	• n520949 – n521222 (individual items) • n520947 (start PLATE no. - age range (12 months) into which CM falls) • n521223 (basal 5/5 right) • n521224 (ceiling 5/7 wrong) • n521225 (basal plate no.) • n521227 (ceiling plate no.) • n521229 (total no. errors) Explore these variables in Discovery: NCDS5 Child (1991) Dataset.
Total score/derived variable(s):	n521231 (total maths score = ceiling – total no. errors)
Age of participants (months):	Mean = 109.38, SD = 34.40, Range = 48 – 224
Descriptives:	N = 2,632 Range = 1 - 84 Mean = 38.38 SD = 16.61

NCDS Mother and Child Study (CM child; 1991): PIAT Maths	
	
Other sweep and/or cohort:	None
Source:	Dunn, L. M., & Markwardt Jr, F. C. (1970). Peabody Individual Achievement Test Manual (Circle Pines, MN American Guidance Service)
Technical resources:	For further details see: Baker, P. C. and Mott F.L. (1993). NLSY Child Handbook: A Guide to the 1986-1990 National Longitudinal Survey of Youth Child Data. Revised Edition. Columbus, Ohio Center for Human Resource Research, The Ohio State University. https://www.nlsinfo.org/sites/default/files/attachments/121214/ChildHandbook1990%20part%201.pdf
Example articles:	• Verropoulou, G., & Joshi, H. (2009). Does mother's employment conflict with child development? Multilevel analysis of British mothers born in 1958. Journal of Population Economics, 22(3), 665-692. • Michael, R. (2011). Family caring and children's reading and math skills. Longitudinal and Life Course Studies, 2(3), 301-318. • Parcel, T. L., & Campbell, L. A. (2017). Can the welfare state replace parents? Children's cognition in the United States and Great Britain. Social science research, 64, 79-95.

3.4.3 PIAT Reading Recognition Subscale

NCDS Mother and Child Study (CM child; 1991): PIAT Reading Recognition Subscale	
Domain:	Verbal (oral reading)
Measures:	Word recognition
CHC:	Gc (Crystallised intelligence) Grw (Reading/writing)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 33 Survey (1991).

NCDS Mother and Child Study (CM child; 1991): PIAT Reading Recognition Subscale	
Administration method:	Interviewer at home; face to face; child reads and says out loud
Procedure:	Method consists of 84 multiple-choice items of increasing difficulty, beginning with matching and naming letters and moving on to reading single words aloud. Children read a word silently and then said it out loud. Entry to the test is determined by the PIAT Maths score. The interviewer: • identified the start point (using the PPVT age) • established basal (5 correct answers in a row) and ceiling (5 out of 7 responses wrong) points. If the child did not get the first 5 items correct, then the test was moved back 5 words and started from there. The ceiling was identified when 5 out of 7 items were incorrect or if item 84 was reached.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/Ncds5d.pdf
Scoring:	Last item (out of 84) reached on test (ceiling) minus the total number of incorrect responses. (see source materials)
Item-level variable(s):	• n521336 (maths score) • n521339-n521459 (individual items) • n521460 (Basal 5/5 right) • n521461 (ceiling 5/7 wrong) • n521462 (Basal plate no.) • n521464 (Ceiling plate no.) • n521466 (total no. errors) Explore these variables in Discovery: NCDS5 Child (1991) Dataset.
Total score/derived variable(s):	n521468 (total reading = ceiling – total no. errors)
Age of participants (months):	Mean = 109.67, SD = 34.34, Range = 47 – 224
Descriptives:	N = 2,616 Range = 1 – 84 Mean = 41.27 SD = 20.01

NCDS Mother and Child Study (CM child; 1991): PIAT Reading Recognition Subscale	
	
Other sweep and/or cohort:	None
Source:	Dunn, L.M., & Markwardt Jr, F.C. (1970). Peabody Individual Achievement Test Manual (Circle Pines, MN American Guidance Service)
Technical resources:	For further details see: Baker, P. C. and Mott F.L. (1993). NLSY Child Handbook: A Guide to the 1986-1990 National Longitudinal Survey of Youth Child Data. Revised Edition. Columbus, Ohio Center for Human Resource Research, The Ohio State University. https://www.nlsinfo.org/sites/default/files/attachments/121214/ChildHandbook1990%20part%201.pdf
Example articles:	• Verropoulou, G., & Joshi, H. (2009). Does mother's employment conflict with child development? Multilevel analysis of British mothers born in 1958. Journal of Population Economics, 22(3), 665-692. • Michael, R. (2011). Family caring and children's reading and math skills. Longitudinal and Life Course Studies, 2(3), 301-318. • Parcel, T. L., & Campbell, L. A. (2017). Can the welfare state replace parents? Children's cognition in the United States and Great Britain. Social science research, 64, 79-95.

3.4.4 PIAT Reading Comprehension Subscale

NCDS Mother and Child Study (CM child; 1991): PIAT Reading Comprehension Subscale	
Domain:	Verbal (word meaning)
Measures:	Word understanding / lexical comprehension
CHC:	Gc (Crystallised) Grw (Reading/Writing)

NCDS Mother and Child Study (CM child; 1991): PIAT Reading Comprehension Subscale	
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 33 Survey (1991).
Administration method:	Interviewer at home; face to face; child reads and says out loud
Procedure:	Consists of 56 items of increasing difficulty. The child read a sentence and selected one of four pictures which best portrayed the meaning of the sentence. Entry to the test was determined by the PIAT Reading Recognition Score. The interviewer: • identified the start point (using the PPVT age) • established basal (5 correct answers in a row) and ceiling (5 out of 7 responses wrong) points. If the child did not get the first 5 items correct, then the test was moved back 5 words and started from there. The ceiling was identified when 5 out of 7 items were incorrect or if item 84 was reached.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/Ncds5d.pdf
Scoring:	(see source materials)
Item-level variable(s):	• n521513 (score from reading Test I) • n521515 – n521680 (individual items) • n521713 (Basal 5/5 right) • n521714 (ceiling 5/7 wrong) Explore these variables in Discovery: NCDS5 Child (1991) Dataset.
Total score/derived variable(s):	None
Age of participants (months):	Mean = 112.42, SD = 33.64, Range = 47 - 224
Descriptives:	Not available (see technical resources on deriving scores)
Other sweep and/or cohort:	None
Source:	Dunn, L. M., & Markwardt Jr, F. C. (1970). Peabody Individual Achievement Test Manual (Circle Pines, MN American Guidance Service)
Technical resources:	For further details see: Baker, P. C. and Mott F.L. (1993). NLSY Child Handbook: A Guide to the 1986-1990 National Longitudinal Survey of Youth Child Data. Revised Edition. Columbus, Ohio Center for Human

NCDS Mother and Child Study (CM child; 1991): PIAT Reading Comprehension Subscale	
	Resource Research, The Ohio State University. https://www.nlsinfo.org/sites/default/files/attachments/121214/ChildHandbook1990%20part%201.pdf
Example articles:	• Michael, R. (2003). Children's cognitive skill development in Britain and the United States. *International Journal of Behavioral Development*, *27*(5), 396-408.

3.4.5 McCarthy Scale of Children's Abilities: Verbal Memory Subscale (intended for respondents aged 3 years to 6 years 11 months)

NCDS Mother and Child Study (CM child; 1991): McCarthy Scale of Children's Abilities: Verbal Memory Subscale	
Domain:	Verbal (vocabulary)
Measures:	Short term verbal memory
CHC:	Gsm (Short-term memory)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 33 Survey (1991)
Administration method:	Interviewer at home; face to face; interviewer reads and child recalls out loud.
Procedure:	The child repeated words or sentences read to them by the interviewer. The interviewer read a story and the child retold the essential elements.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/Ncds5d.pdf
Scoring:	(see source materials)
Item-level variable(s):	n520838 – n520923 (individual items and overall summaries) Explore these variables in Discovery: NCDS5 Child (1991) Dataset.
Total score/derived variable(s):	None
Age of participants (months):	Mean = 66.05, SD = 10.68, Range = 46 – 124
Descriptives:	Not available (see technical resources on deriving scores)
Other sweep	None

NCDS Mother and Child Study (CM child; 1991): McCarthy Scale of Children's Abilities: Verbal Memory Subscale	
and/or cohort:	
Source:	McCarthy, D. (1972). *Manual for the McCarthy Scales of Children's Abilities.* Cleveland The Psychological Corporation).
Technical resources:	For further details see: Baker, P. C. and Mott F.L. (1993). NLSY Child Handbook: A Guide to the 1986-1990 National Longitudinal Survey of Youth Child Data. Revised Edition. Columbus, Ohio Center for Human Resource Research, The Ohio State University. https://www.nlsinfo.org/sites/default/files/attachments/121214/ChildHandbook1990%20part%201.pdf
Example articles:	• Michael, R. (2003). Children's cognitive skill development in Britain and the United States. *International Journal of Behavioral Development*, *27*(5), 396-408.

3.4.6 Wechsler Intelligence Scale for Children – Revised (WISC-R): Digit Span Subscale (intended for respondents aged 7 years and older)

NCDS Mother and Child Study (CM child; 1991): WISC-R Digit Span Subscale	
Domain:	Verbal (auditory- working memory)
Measures:	Memory span Working memory
CHC:	Gsm (Short-Term Memory)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 33 Survey (1991)
Administration method:	Interviewer; spoken and child repeats
Procedure:	Consists of 28 items; 14 forward and 14 backward. The interviewer read out digits (from 3 to 9), the child listened and repeated the sequence of numbers read out. The child then listened to sequences of numbers read out by the interviewer and repeated them in reverse order. In both parts, the length of the sequence of numbers increased as the child responds correctly.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/Ncds5d.pdf
Scoring:	(see source materials)

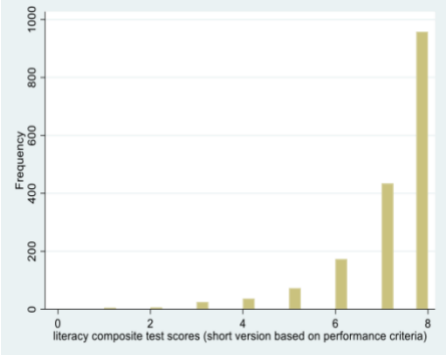
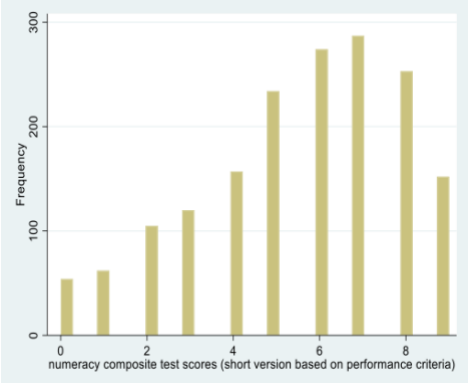
NCDS Mother and Child Study (CM child; 1991): WISC-R Digit Span Subscale	
Item-level variable(s):	• n521738 – n521751 (forward items) • n521752 – n521765 (backward items) Explore these variables in Discovery: NCDS5 Child (1991) Dataset
Total score/derived variable(s):	None
Age of participants (months):	M = 124.82, SD = 28.46, range = 64 - 224
Descriptives:	Not available (see technical resources on deriving scores)
Other sweep and/or cohort:	• BCS70 (age 10) • ALSPAC (age 49 months and 61 months)
Source:	Weschler, D. (1974). *Weschler Intelligence Scales for Children - Revised (New* York The Psychological Corporation)
Technical resources:	For further details see: Baker, P. C. and Mott F.L. (1993). NLSY Child Handbook: A Guide to the 1986-1990 National Longitudinal Survey of Youth Child Data. Revised Edition. Columbus, Ohio Center for Human Resource Research, The Ohio State University. https://www.nlsinfo.org/sites/default/files/attachments/121214/ChildHandbook1990%20part%201.pdf
Example articles:	• Michael, R. (2003). Children's cognitive skill development in Britain and the United States. *International Journal of Behavioral Development*, *27*(5), 396-408.

3.5 NCDS Age 37 sub-study (1995)

The NCDS age 37 years sub-study was conducted in 1995, between the full surveys that took place at ages 33 and 42 years. The sub-study aimed to collect details about cohort members' basic skills and was designed to supplement the information on self-reported literacy and numeracy problems gathered at age 33 and 42 years, with objective assessments of skills in these areas. A 10% representative sample of the full NCDS sample was used for the sub-study (N = 1,714).

3.5.1 Basic literacy and numeracy skills

NCDS Age 37 sub-study (1995): Basic literacy and numeracy skills	
Domain:	Adult basic literacy and numeracy
Measures:	(Functional) literacy and numeracy assessment. The assessment covered four levels for communication skills and the three levels for numeracy as defined by Adult Literacy and Basic Skills Unit's (ALBSU) Basic Skills Standards. These emphasise 'functional' performance, i.e. the ability to apply basic skills in everyday life situations (ACACE, 1982).
CHC:	None
CLOSER Source:	Not currently available in CLOSER Discovery
Administration method:	Interviewer; face to face; pen and paper/show cards
Procedure:	There were eight literacy and nine numeracy tasks for study members to complete. The majority of tasks had two or three sub-questions. 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. If three questions in a row were incorrect for the literacy test the CM moved onto the numeracy questions. Duration: 30 minutes for both tests.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS-37-year-Sample-Survey-%C3%BB-Guide.pdf
Scoring:	A score of 1 was assigned to correct answers and the individual scores aggregated to produce for each cohort member an overall numeracy and literacy score. The aggregate scores were then grouped into a fourfold classification of "very low", "low", "average" and "good" for both numeracy and literacy abilities. See the document 'NCDS37yearSampleSurveyGuide.pdf/' which accompanies the UK Data Service data download for syntax for literacy and numeracy scores (pp. 156-158).
Item-level variable(s):	• nss1426 – nss1456 (literacy tasks 1 - 8 incl. sub-questions) • nss1470 – nss1535 (numeracy tasks 10 - 18 incl. sub-questions)
Total score/derived variable(s):	• litscor1 (literacy composite test scores 0 - 8) • litscor2 (literacy composite test scores long version) • numscor1 (numeracy composite test scores 0 - 9) • numscor2 (numeracy composite test scores long version)

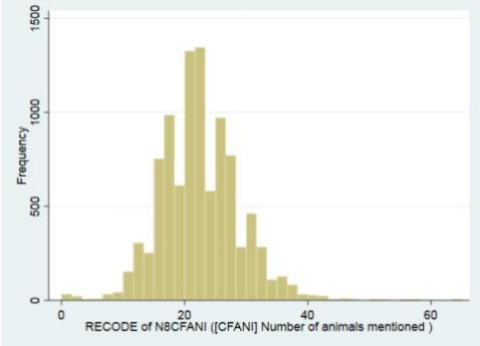
	• litscor3, numscor3, litscor4, numscor4 (composite test scores rescaled) • litgrp1, litgrp2, litgrp2a, numgrp1, numgrp2, numgrp2a (categorical)
Age of participants (months):	No age data available.
Descriptives:	Literacy composite: N = 1,712 Range = 0 – 8 Mean = 7.21 SD = 1.20  Numeracy composite: N = 1,698 Range = 0 – 9 Mean = 5.58 SD = 2.36 
Other sweep and/or cohort:	• BCS70 (age 21)* • BCS70 (age 34) different set of questions covering literacy and numeracy) *BCS70 devised to be comparable with NCDS

NCDS Age 37 sub-study (1995): Basic literacy and numeracy skills	
Source:	The assessments were created based on development work undertaken on behalf of the Agency by National Foundation for Educational Research (NFER).
Technical resources:	Dodgeon, B. & Shepherd, P. (2017) National Child Development Study Thirty Seven-Year Sample Survey: Guide to data available at the UK Data Archive. Centre for Longitudinal Studies. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS-37-year-Sample-Survey-%C3%BB-Guide.pdf
Example articles:	• Bynner, J., & Parsons, S. (1997). It doesn't get any better: the impact of poor basic skills on the lives of 37 year olds. A summary. London: The Basic Skills Agency. • McIntosh, S., & Vignoles, A. (2001). Measuring and assessing the impact of basic skills on labour market outcomes. *Oxford Economic Papers*, *53*(3), 453-481. • Vignoles, A., De Coulon, A., & Marcenaro-Gutierrez, O. (2011). The value of basic skills in the British labour market. *Oxford Economic Papers*, *63*(1), 27-48.

3.6 NCDS Age 50 (2008)

3.6.1 Verbal Fluency (Animal Naming) Test

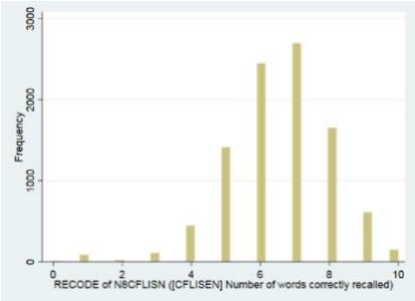
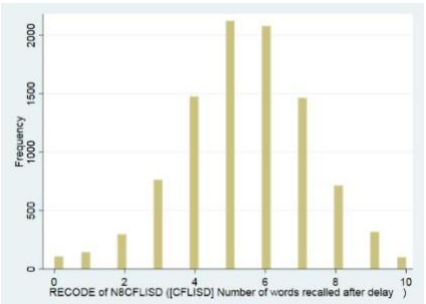
NCDS Age 50 (2008): Verbal Fluency (Animal Naming) Test	
Domain:	Verbal (fluency)
Measures:	Verbal/semantic fluency Executive function
CHC:	Glr (Long-term storage and retrieval)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 50 Survey (2008).
Administration method:	Trained interviewer; computer-assisted personal interview (CAPI)
Procedure:	Participants were asked to name as many different animals as possible within a one-minute timeframe. The interviewer made a note of each named animal and entered the total number into the CAPI programme. Repetitions, named animals (e.g. Bambi), and redundancies (e.g. white cat, black cat) were not included in the total score.

NCDS Age 50 (2008): Verbal Fluency (Animal Naming) Test	
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS_8_FINAL_MAINSTAGE_DOCUMENTATION.pdf
Scoring:	Total number of animals named.
Item-level variable(s):	None
Total score/derived variable(s):	N8CFANIT – N8CFANI Explore these variables in Discovery: NCDS8 CAI Questionnaire (2008) Dataset.
Age of participants (months):	Mean = 608.270, SD = 1.92, Range = 598-614
Descriptives:	N = 9,648 Range = 0 - 65 Mean = 22.28 SD = 6.30 
Other sweep and/or cohort:	• NCDS (Age 61 - 63) • NSHD (Age 53 years) • BCS70 (Age 46-47)
Source:	Taken from Section B (cognitive assessment) of the Cambridge Mental Disorders of the Elderly Examination (CAMDEX) (Roth et al., 1986). Cognitive measures at this sweep were taken from the 2002 English Longitudinal Study of Ageing (ELSA) (Taylor et al., 2007).
Technical resources:	Brown, M., & Dodgeon, B. (2010). NCDS cognitive assessments at age 50: initial results. London: Centre for Longitudinal Studies. https://discovery.ucl.ac.uk/id/eprint/10001204/
Example articles:	• Dregan, A., & Gulliford, M. C. (2013). Leisure-time physical activity over the life course and cognitive functioning in late mid-adult years: a cohort-based investigation. *Psychological Medicine*, 43(11),

NCDS Age 50 (2008): Verbal Fluency (Animal Naming) Test	
	2447-2458. • Bowling, A., Pikhartova, J., & Dodgeon, B. (2016). Is mid-life social participation associated with cognitive function at age 50? Results from the British National Child Development Study (NCDS). *BMC Psychology*, 4(1), 58.

3.6.2 Verbal Learning/Word List Recall Test (Immediate and Delayed)

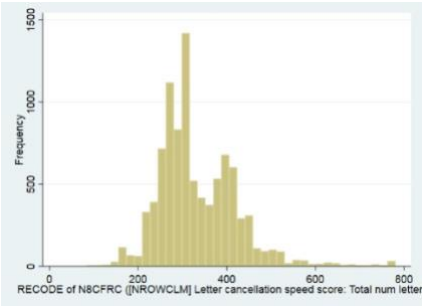
NCDS Age 50 (2008): Verbal Learning/Word List Recall Test (Immediate and Delayed)	
Domain:	Verbal (memory)
Measures:	Attention Short-term episodic memory Verbal memory
CHC:	Glr (Long-Term Storage and Retrieval)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 50 Survey (2008).
Administration method:	Computer-assisted personal interview (CAPI); presented aurally; orally recalled.
Procedure:	One of four lists of 10 common words were selected by the CAPI, and are presented to participant via a recorded voice at a rate of one word every 2-seconds. In cases where the computer voice was not audible, the interviewer read the words, mimicking the pace and clarity of the recorded voice. After the list was read out, the participant was given two minutes to recall as many of the words as they could (in no particular order). The interviewer made a note of the number of correctly recalled words, and entered this total into the CAPI. After additional tests were administered (animal naming and letter cancellation), the interviewer asked the participant to again recall as many words as possible from the original list (words not repeated by CAPI/interviewer). This delayed memory task was done approximately five minutes after the initial recall task. Again, the interviewer made a note of each correctly recalled word, and entered the total number into the CAPI.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS_8_FINAL_MAINSTAGE_DOCUMENTATION.pdf

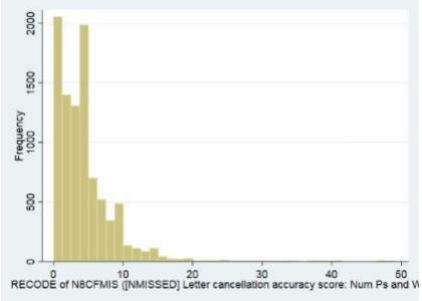
NCDS Age 50 (2008): Verbal Learning/Word List Recall Test (Immediate and Delayed)	
Scoring:	Immediate recall: 10 items (scores range 0 - 10) Delayed recall: 10 items (scores range 0 - 10)
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	N8INTCF – N8CFLISD Explore these variables in Discovery: NCDS8 CAI Questionnaire (2008) Dataset.
Age of participants (months):	Mean = 608.27, SD = 1.92, Range = 598 - 614
Descriptives:	Recall (immediate): N = 9,648 Range = 0 - 10 Mean = 6.54 SD = 1.49  Recall (delayed): N = 9,591 Range = 0 - 10 Mean = 5.41 SD = 1.84 
Other sweep and/or cohort:	• NCDS (2018; Age 61 - 63): Proposed repeat ofcognitive measures at age 50 • NSHD (1943; Age 43, 53, 60 -64, 68 - 70)* • BCS70 (2016; Age 46)

NCDS Age 50 (2008): Verbal Learning/Word List Recall Test (Immediate and Delayed)	
	* For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. A simple total score is available calculated as the sum of the words correctly recalled at each trial.
Source:	Similar tasks have been used to measure verbal learning for decades, e.g. Bush and Mosteller (1955). Cognitive measures at this sweep were taken from the 2002 English Longitudinal Study of Ageing (ELSA; Taylor et al., 2007).
Technical resources:	Brown, M., & Dodgeon, B. (2010). NCDS cognitive assessments at age 50: initial results. London: Centre for Longitudinal Studies. https://discovery.ucl.ac.uk/id/eprint/10001204/
Example articles:	• Calvin, C. M., Batty, G. D., Lowe, G., & Deary, I. J. (2011). Childhood intelligence and midlife inflammatory and hemostatic biomarkers: The National Child Development Study (1958) cohort. *Health Psychology*, 30(6), 710. • Dregan, A., & Gulliford, M. C. (2013). Leisure-time physical activity over the life course and cognitive functioning in late mid-adult years: a cohort-based investigation. *Psychological Medicine*, 43(11), 2447-2458. • Bowling, A., Pikhartova, J., & Dodgeon, B. (2016). Is mid-life social participation associated with cognitive function at age 50? Results from the British National Child Development Study (NCDS). *BMC Psychology*, 4(1), 58.

3.6.3 Timed Letter Search/Letter Cancellation Test

NCDS Age 50 (2008): Timed Letter Search/Letter Cancellation Test	
Domain:	Processing speed
Measures:	Attention/concentration Mental speed Visual scanning
CHC:	Gv (Visual Processing) Gs (Processing Speed)
CLOSER Source:	Explore this sweep in Discovery: NCDS Age 50 Survey (2008)
Administration	Trained interviewer; pen and paper.

NCDS Age 50 (2008): Timed Letter Search/Letter Cancellation Test method:	
Procedure:	Participants were given a page of random letters arranged in rows (N = 26) and columns (N = 30). They were asked to cross out as many target letters ("Ps" and "Ws") as possible within a one- minute timeframe. Respondents were instructed to work across each row from left-to right as if they were reading a page and they were asked to perform the task as quickly and accurately as possible. Once the allotted time was over, they were asked to underline the last letter that reached their eye (any letter, target or otherwise). The total number of letters searched was summed to provide a measure of speed of processing, whereas the total number of target letters missed reflects level of accuracy.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/NCDS_8_FINAL_MAINSTAGE_DOCUMENTATION.pdf
Scoring:	Speed of processing: summed total of letters scanned (0 -65) Accuracy: summed total of target letters missed (0 -65)
Item-level variable(s):	None
Total score/derived variable(s):	N8CFLET – N8CFRC Explore these variables in Discovery: NCDS8 CAI Questionnaire (2008) Dataset.
Age of participants (months):	Mean = 608.270, SD = 1.92, Range = 598-614
Descriptives:	Processing speed: N = 9,442 Range = 84 - 780 Mean = 334.10 SD = 88.83  Processing accuracy:

NCDS Age 50 (2008): Timed Letter Search/Letter Cancellation Test	
	N = 9,442 Range = 0 - 49 Mean = 4.42 SD = 4.12 
Other sweep and/or cohort:	• NCDS Sweep 9 (2018; age 61 - 63): Proposed repeat ofcognitive measures at age 50 • BCS70 (2016; age 46) • NSHD (1989; Age 43*, 53, 60 -64, 68-70) * 3 trials.
Source:	The letter cancellation test was initially developed for the NSHD 1946 birth cohort study and has also been used in the MRC Cognitive Function and Ageing Study (MRC CFA Study, 1998). All cognitive measures at this sweep were taken from the 2002 English Longitudinal Study of Ageing (ELSA) (Taylor et al., 2007).
Technical resources:	• Banks, J., Breeze, E., Lessof, C., & Nazroo, J. (2006). Retirement, health and relationships of the older population in England: The 2004 English Longitudinal Study of Ageing (Wave 2). https://discovery.ucl.ac.uk/id/eprint/15351/1/15351.pdf • Brown, M., &Dodgeon, B. (2010). NCDS cognitive assessments at age 50: initial results. London: Centre for Longitudinal Studies. https://discovery.ucl.ac.uk/id/eprint/10001204/
Example articles:	• Dregan, A., & Gulliford, M. C. (2013). Leisure-time physical activity over the life course and cognitive functioning in late mid-adult years: a cohort-based investigation. *Psychological Medicine*, 43(11), 2447-2458. • Bowling, A., Pikhartova, J., & Dodgeon, B. (2016). Is mid-life social participation associated with cognitive function at age 50? Results from the British National Child Development Study (NCDS). *BMC Psychology*, 4(1), 58.

3.7 NCDS Age 62 (2020)

Data collection is complete and data will be made available for research in autumn 2024. Cognitive measures from NCDS sweep 8 (age 50) were re-administered: i) animal naming, ii) word list recall (immediate and delayed), iii) letter cancellation.

4. 1970 British Cohort Study (BCS70)

4.1 BCS70 Age 22 months sub-sample (1972)

At age 22 months (and 42 months), a sub-sample (N = 2,457) of BCS70 children were studied. This sub-study was carried out to explore the effect of foetal malnutrition in brain cell proliferation, which was a medical concern at the time. A 10% random sample of all births was included together with those children who were considered to be at risk from foetal malnutrition.

4.1.1 Developmental Milestones

BCS70 Age 22 months (sub-sample; 1972): Developmental Milestones	
Domain:	Developmental milestones
Measures:	Gross and fine motor coordination Speech and language Personal and social Drawing
CHC:	None
CLOSER Source:	Not currently available in CLOSER Discovery
Administration method:	In clinic; questionnaire completed by a doctor
Procedure:	The child was asked to perform certain tasks, for example walking, balancing (gross-motor), holding a pencil (fine-motor), say 'mama', 'dada', point to facial features (speech and language) and take off their shoes (personal and social). The doctor recorded whether the task was observed and asked the mother if the child could perform each task. In addition, the child was given a pencil and asked to scribble, draw a circle, vertical line and a cross.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/06/22mth_Questionnaire.pdf
Scoring:	No referenced example (see technical resource)
Item-level variable(s):	• b0030 – b0037 (gross-motor) • b0038 – b0039 (fine-motor) • b0044 – b0063 (speech and language) • b0064 – b0082 (personal and social)

BCS70 Age 22 months (sub-sample; 1972): Developmental Milestones	
	• b0040 – b0043 (drawing)
Total score/derived variable(s):	None
Age of participants (months):	22 months
Descriptives:	(Individual variables – see questionnaire documentation page 18 https://cls.ucl.ac.uk/wp-content/uploads/2017/06/22mth_Guide.pdf)
Other sweep and/or cohort:	• BCS70 (age 42 months) - similar
Source:	See technical resource.
Technical resources:	Chamberlain, R., & Davey, A. (1976). Cross-sectional Study of Developmental Test Items in Children Aged 94 to 97 Weeks: Report of the British Births Child Study. *Developmental Medicine & Child Neurology*, *18*(1), 54-70. https://doi.org/10.1111/j.1469-8749.1976.tb03605.x
Example articles:	• Cheung, Y. B. (2002). Zero-inflated models for regression analysis of count data: a study of growth and development. *Statistics in Medicine*, *21*(10), 1461-1469. • Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P. & Sexton, H. (2007). School readiness and later achievement. *Developmental Psychology*, *43*(6), 1428.

4.2 BCS70 Age 42 months sub-sample (1973)

As with the sub-study at 22 months, at 42 months a sub-sample (N = 2,315) of BCS70 children were studied, with the aim of exploring the effect of foetal malnutrition in brain cell proliferation. A 10% random sample of all births was included together with those children who were considered to be at risk from foetal malnutrition.

4.2.1 Developmental Milestones

BCS70 Age 42 months (sub-sample; 1973): Developmental milestones	
Domain:	Developmental milestones

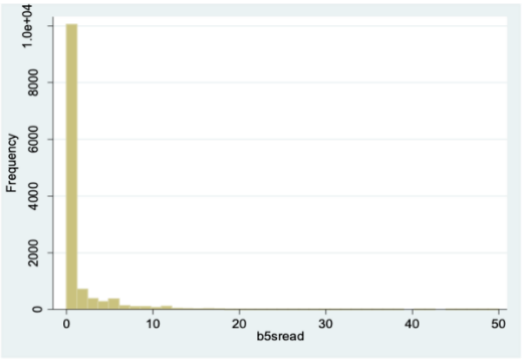
BCS70 Age 42 months (sub-sample; 1973): Developmental milestones	
Measures:	Gross motor coordination Speech and language Copying designs Drawing a man
CHC:	None
CLOSER Source:	Not currently available in CLOSER Discovery
Administration method:	In clinic, questionnaire completed by a doctor
Procedure:	The child was asked to perform certain tasks, for example copying designs using cubes, point to pictures, balance (gross- motor), and draw shapes and a man. The doctor recorded whether the task was observed.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70_42-month_sub-study_questionnaire.pdf
Scoring:	No referenced example (see "Technical resources" below)
Item-level variable(s):	• c0040 – c0047e (cube task) • c0048a – c0051b (speech and language) • c0052 – c0056 (drawing) • c0057a – c0059 (paper and folding) • c0060 – c0061 (parts of body) • c0062a – c0065 (gross-motor)
Total score/derived variable(s):	None
Age of participants (months):	42 months
Descriptives:	See survey guide https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70_42mth_Guide.pdf
Other sweep and/or cohort:	• BCS70 (age 22 months) - similar
Source:	See "Technical resources" below
Technical resources:	Chamberlain, R., & Davey, A. (1976). Cross-sectional Study of Developmental Test Items in Children Aged 94 to 97 Weeks: Report of the British Births Child Study. *Developmental Medicine & Child*

BCS70 Age 42 months (sub-sample; 1973): Developmental milestones	
	Neurology, *18*(1), 54-70. https://doi.org/10.1111/j.1469-8749.1976.tb03605.x
Example articles:	• Feinstein, L. (2003). Inequality in the early cognitive development of British children in the 1970 cohort. Economica, 70(277), 73-97. • Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P…. & Sexton, H. (2007). School readiness and later achievement. Developmental Psychology, 43(6), 1428.

4.3 BCS70 Age 5 (1975)

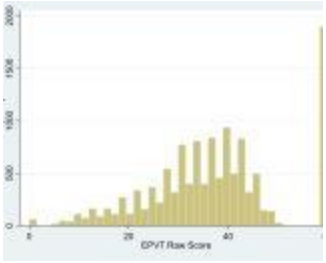
4.3.1 Schonell Reading Test (SRT)

BCS70 Age 5 (1975): Schonell Reading Test (SRT)	
Domain:	Verbal (reading)
Measures:	Children's reading age (of children between age 5 and 14+ years). Reading age is calculated from the number of words read correctly and compared to the child's chronological age.
CHC:	Gc (Crystallized Intelligence) Grw (Reading/Writing)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 5 Survey (1975).
Administration method:	Health visitor at home; face to face; read aloud
Procedure:	Before the test was administered, the child's mother was asked if she thought the child had begun to read at all. If the mother said the child could read some words or some sentences the child was given a card with 50 words on it, which were read from left to right. When a child struggled with a word, they were asked to sound it out. If the child still couldn't say what the word was, they were asked to try the next one. The test was stopped when the child made five consecutive mistakes.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70_age5_test_booklet.pdf
Scoring:	50 words (first of original 100). Score of one for each word read correctly.
Item-level variable(s):	f099 (can the child read; 68% (8,603) could not read or could only read some letters)

BCS70 Age 5 (1975): Schonell Reading Test (SRT)	
Total score/derived variable(s):	• f100 (correct responses) • f101 (incorrect responses)
Age of participants (months):	Mean = 61.78, SD = 1.33, Range = 60 - 77
Descriptives:	N = 12,646 Range = 0 – 50 Mean = 1.43 SD = 3.87 
Other sweep and/or cohort:	None
Source:	Shortened version - original 100 words. Schonell & Goodacre (1971). The psychology and teaching of reading. Oliver & Boyd, London.
Technical resources:	Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf
Example articles:	• Schoon, I., Parsons, S., Rush, R., & Law, J. (2010). Children's language ability and psychosocial development: A 29-year follow-up study. *Pediatrics*, *126*(1), e73-80. • Parsons, S., Green, F., Ploubidis, G. B., Sullivan, A., & Wiggins, R. D. (2017). The influence of private primary schooling on children's learning: Evidence from three generations of children living in the UK. *British Educational Research Journal*, *43*(5), 823-847.

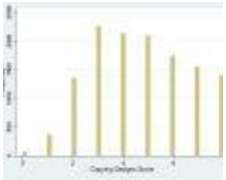
4.3.2 English Picture Vocabulary Test (EPVT)

BCS70 Age 5 (1975): English Picture Vocabulary Test (EPVT)	
Domain:	Verbal (vocabulary)
Measures:	Language comprehension
CHC:	Gc (Crystallised ability)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 5 Survey (1975)
Administration method:	Health visitor at home; face to face; picture and point
Procedure:	56 sets of four different pictures with a particular word associated with each set of four pictures, increasing in difficulty. The child was asked to indicate the one picture that corresponded to the given word until the child made five mistakes in a run of eight consecutive items. The first two words were drum and time, the last two are reel and coast.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70_age5_test_booklet.pdf
Scoring:	56 sets, 1 point for each correct answer. NB. In the original scoring, 64 children did not have a 'base' item, i.e. they did not get 5 of the first eight items correct, and 1,897 children did not have a 'ceiling' item, i.e. the test was completed before they had failed to score 5 in a run of eight items. These children were not awarded a score. To include the children who had no ceiling or base item, the number of items that the children correctly identified was used instead, giving a distribution of 0 - 56. For further details of the original scoring see page 241 in the user guide to the age 5 data at https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70_userguide_age_5.pdf In the derived dataset f117 they appear as 0 and 60.
Item-level variable(s):	• f084 (Error Check) • f085 (Base Item) • f086 (Ceiling Item) • f087 (Incorrect Responses)
Total score/derived variable(s):	• f117 (EPVT raw score; need to account for ceiling and base items when using the raw data) • f120 (standardised EPVT)* • bd2read (derived standardised EPVT score)*

BCS70 Age 5 (1975): English Picture Vocabulary Test (EPVT)	
	* variables may have been updated, please check carefully
Age of participants (months):	Mean = 61.78, SD = 1.33, Range = 60 -77
Descriptives:	N = 12,235 Range = 0 - 60 Mean = 36.97 SD = 13.35 
Other sweep and/or cohort:	• BCS70 (age 10 PLCT based on EPVT; more items) • NCDS (children of cohort member, multi-age) (US version - PPVT)
Source:	Brimer, M. A., & Dunn, L. M. (1962). English Picture Vocabulary Test: Educational Evaluation Enterprises. English version of the Peabody Picture Vocabulary Test (PPVT; Dunn, 1959).
Technical resources:	• Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf • Golding, J. (1975). The 1970 Birth Cohort 5-Year Follow-up: Guide to the dataset, University of Bristol: Institute of Child Health.
Example articles:	• Bijur, P. E., Haslum, M., & Golding, J. (1990). Cognitive and behavioral sequelae of mild head injury in children. *Pediatrics*, *86*(3), 337-344. • Parsons, S., Schoon, I., Rush, R., & Law, J. (2011). Long-term outcomes for children with early language problems: Beating the odds. *Children & Society*, *25*(3), 202-214.

4.3.3 Copying Designs Test (CDT)

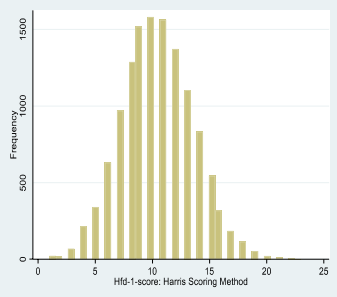
BCS70 Age 5 (1975): Copying Designs Test (CDT)	
Domain:	Visual spatial

BCS70 Age 5 (1975): Copying Designs Test (CDT)	
Measures:	Visual motor co-ordination. Ability to reproduce shapes.
CHC:	Gv (Visual processing)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 5 Survey (1975).
Administration method:	Health visitor at home; drawing
Procedure:	The child was given a booklet, and asked to copy 8 drawings, one at a time twice on two consecutive pages of booklet.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70_age5_test_booklet.pdf
Scoring:	Score 0 -8. Each drawing was scored 0 or 1. As not all children completed two copies a score of 1 was given if at least one copy was good. Total score was the sum of the score for the individual drawings. Zero was awarded when a child attempted to copy at least one design but all attempts were judged to be poor copies.
Item-level variable(s):	f004 – f019
Total score/derived variable(s):	• f119 (Copying Designs Score; raw total) • f122 (Copying Designs Score; standardised)* *variable may have been updated, please check carefully
Age of participants (months):	Mean = 61.78, SD = 1.33, Range = 60 - 77
Descriptives:	N = 13,028 Range = 0 - 8 Mean = 4.73 SD = 1.98 
Other sweep and/or cohort:	• BCS70 (children of cohort member, multi-age - no data available) • NCDS (age 7 and 11) - 6 designs
Source:	Used in previous studies (Davie, et al., 1972; Rutter et al., 1970). • Rutter, M., Tizard, J., & Whitmore, K. (1970). Education, Health and Behaviour. London, Longman.

BCS70 Age 5 (1975): Copying Designs Test (CDT)	
	• Davie, R., Butler, N.R., & Goldstein, H. (1972). From Birth to Seven. A report of the National Child Development Study. London: Longman.
Technical resources:	• Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. • Golding, J. (1975). The 1970 Birth Cohort 5-Year Follow-up: Guide to the dataset, University of Bristol: Institute of Child Health.
Example articles:	• Blanden, J., Gregg, P., & Macmillan, L. (2006). *Accounting for intergenerational income persistence: non-cognitive skills, ability and education.* CEEDP (73). Centre for the Economics of Education, London School of Economics and Political Science, London, UK. • White, J., & Batty, G.D. (2012). Intelligence across childhood in relation to illegal drug use in adulthood: 1970 British Cohort Study. *Journal of Epidemiology and Community Health*, *66*(9), 767-774.

4.3.4 Human Figure Drawing (HFD; Goodenough, 1926; Harris, 1963)

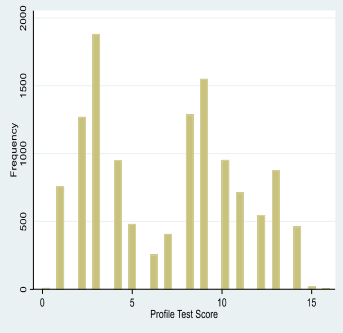
BCS70 Age 5 (1975): Human Figure Drawing (HFD)	
Domain:	General ability (perceptual)
Measures:	General mental and perceptual ability. Indicative of 'conceptual maturity' (Harris, 1963)
CHC:	Gv (Visual processing)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 5 Survey (1975).
Administration method:	Health visitor at home; draw
Procedure:	The child was asked to 'make a picture of a man or a lady'. (Terms such as 'daddy', 'mummy', 'boy', 'girl', etc., could be used if the child responded better to those). They were asked to make the best picture they could and to draw a whole person, not just a face or head. When the child had finished, if anything was not clear, the child was asked what the various parts of the drawings were and these were labelled.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70_age5_test_booklet.pdf
Scoring:	The scoring scheme adopted was based on 30 developmental items suggested by Koppitz (1968), but used the Harris point system of scoring, whereby one point was awarded for each item represented in

	BCS70 Age 5 (1975): Human Figure Drawing (HFD)
	the drawing (e.g. presence of a head, eyes, etc.) giving a maximum possible score of 30. Weights were assigned to values of items depending on the frequency with which they appeared in the children's drawings. Items which appeared frequently in drawings were assigned negative weights which were applied if children did not produce them. Items which appeared infrequently in drawings were assigned positive weights which were applied if children did produce them. These are the equivalent of the expected and unexpected Items as described by Koppitz for this age group (see Golding pp. 279-283 in "Technical Resources" below).
Item-level variable(s):	f020 – f083
Total score/derived variable(s):	• f113 (Hfd-1-score: Harris Scoring Method) • f114 (Hfd-2-score: Harris Scoring Method) • f115 (Hfd-1-score: Koppitz Scoring Method) • f116 (Hfd-2-score: Koppitz Scoring Method) • f121 (standardised)* * variable currently being updated, please check carefully
Age of participants (months):	Mean = 61.78, SD = 1.33, Range = 60 - 77
Descriptives:	N = 12,784 Range = 1 - 23 Mean = 10.42 SD = 3.15 
Other sweep and/or cohort:	• NCDS (age 7)* *different scoring system
Source:	Modified version of the 'Draw-a-man' test (Goodenough, 1926) and later developed by Harris (1963). • Goodenough, F. L. (1926). The measurement of intelligence by drawings, New York: World Book Company.

BCS70 Age 5 (1975): Human Figure Drawing (HFD)	
	• Harris, D. B. (1963). Children's drawings as measures of intellectual maturity, New York: Harcourt, Brace and World. • Scoring was based on: Koppitz, E M. (1968). Psychological Evaluation of Children's Human Figure Drawings. New York: Grune and Stratton.
Technical resources:	• Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf • Golding, J. (1975). The 1970 Birth Cohort 5-Year Follow- up: Guide to the dataset, University of Bristol: Institute of Child Health.
Example articles:	• Flouri, E. (2006). Parental interest in children's education, children's self-esteem and locus of control, and later educational attainment: Twenty-six year follow-up of the 1970 British Birth Cohort. *British Journal of Educational Psychology*, *76*(1), 41-55. • Batty, G. D., Deary, I. J., Schoon, I., & Gale, C. R. (2007). Mental ability across childhood in relation to risk factors for premature mortality in adult life: the 1970 British Cohort Study. *Journal of Epidemiology & Community Health*, *61*(11), 997-1003. • Meunier, M., De Coulon, A., Marcenaro-Gutierrez, O., & Vignoles, A. (2013). A longitudinal analysis of UK second-generation disadvantaged immigrants. *Education Economics*, 21(2), 105-134.

4.3.5 Complete a Profile Test (CPT; Kalverboer, 1972)

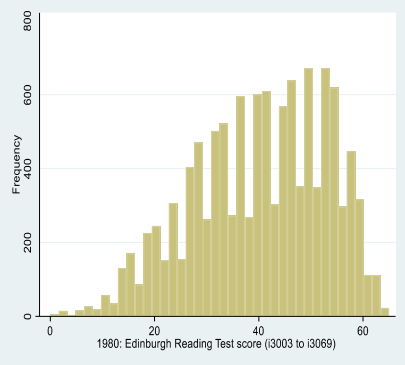
BCS70 Age 5 (1975): Complete a Profile Test (CPT)	
Domain:	Spatial development
Measures:	Spatial-constructive development (Kalverboer, 1972)
CHC:	Gv (Visual processing)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 5 Survey (1975).
Administration method:	Health visitor at home; pen and paper
Procedure:	The child was asked to com]plete an outline picture of a human face in profile by filling in features (eyes, ears, nostrils, mouth, hair etc.).

	BCS70 Age 5 (1975): Complete a Profile Test (CPT)
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70_age5_test_booklet.pdf
Scoring:	The scoring was based on the number and position of features included on the human face in profile. The scoring details are outlined in Figure 7 in Parsons (2014) and Golding (1975, pp. 268-273) in "Technical Resources" below. The maximum score available was 16.
Item-level variable(s):	f090 – f098
Total score/derived variable(s):	f118
Age of participants (months):	Mean = 61.78, SD = 1.33, Range = 60 -77
Descriptives:	N = 12,451 Range = 0 - 16 Mean = 6.02 SD = 3.19 
Other sweep and/or cohort:	None
Source:	Kalverboer, A.F. (1972). A Profile Test for the Spatial- Constructive Development. Lisse: Switz & Zeitlinger.
Technical resources:	• Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf • Golding, J. (1975). The 1970 Birth Cohort 5-Year Follow-up: Guide to the dataset, University of Bristol: Institute of Child Health.
Example articles:	• Feinstein, L. (2003). Inequality in the early cognitive development of British children in the 1970 cohort. *Economica*, 70(277), 73-97.

4.4 BCS70 Age 10 (1980)

4.4.1 Edinburgh Reading Test (Shortened Version)

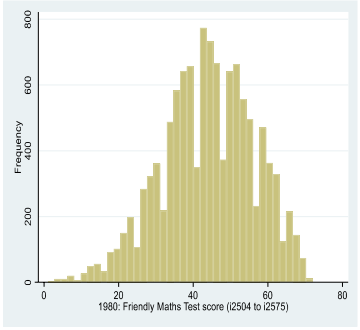
BCS70 Age 10 (1980): Edinburgh Reading Test (Shortened Version)	
Domain:	Verbal: word recognition
Measures:	A test of word recognition, which examined vocabulary, syntax, sequencing, comprehension and retention. Items were carefully selected to cover a wide age range of ability from seven to thirteen years in a form suitable to straddle the ten-year cohort. Particular attention was paid to the lower limit to allow a score to be allocated for very poor readers.
CHC:	Gc (Crystallised ability) and also elements of Grw (Reading/Writing)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 10 S urvey (1980).
Administration method:	In schools; part instructed and child self-completion; pen and paper
Procedure:	There were 67 questions broken down into a number of sections. In the first four the interviewer went through an example at the beginning to show the child what to do: • Section 1: the child selected one from four words to describe a picture (5 items) • Section 2: the child crossed out a word that did not belong in the sequence (5 items) • Section 3: the child matched 5 answers to 5 questions (4 items) • Section 4: the child completed a picture quiz (5 items) In the remaining sections the child read the question and completed the answers without assistance (48 items). Duration: 30 minutes (See “Technical Resources” below for more information)
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS-1980-Edinburgh-Reading-Test.pdf
Scoring:	A score of one was given for each correct answer, with possible scores ranging 0 – 67
Item-level variable(s):	i3003 – 13069

BCS70 Age 10 (1980): Edinburgh Reading Test (Shortened Version)	
Total score/derived variable(s):	• BD3RREAD • BD3READ* • BD3RDAGE* *variables may have been updated, please check carefully
Age of participants (months):	Mean = 121.88, SD = 2.67, Range = 117 - 139
Descriptives:	N = 11,641 Range = 0 - 65 Mean = 40.23 SD = 12.68 
Other sweep and/or cohort:	• BCS70 (age 16) - age 10 test adapted for16-year-olds
Source:	Shortened version developed from Edinburgh Reading Test by Godfrey Thompson Unit (GTU) and BCS70 survey team especially for the BCS70 at age 10. GTU (1978) Edinburgh Reading Test. Sevenoaks: Hodder and Stoughton.
Technical resources:	Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf
Example articles:	• Maughan, B., Taylor, C., Taylor, A., Butler, N., & Bynner, J. (2001). Pregnancy smoking and childhood conduct problems: a causal association? *The Journal of Child Psychology and Psychiatry and Allied Disciplines*, *42*(8), 1021- 1028. • Schoon, I., Bynner, J., Joshi, H., Parsons, S., Wiggins, R. D., & Sacker, A. (2002). The influence of context, timing, and duration of risk experiences for the passage from childhood to midadulthood. *Child development*, *73*(5), 1486-1504.

BCS70 Age 10 (1980): Edinburgh Reading Test (Shortened Version)	
	• Pensiero, N. (2011). Parent-child cultivation and children's cognitive and attitudinal outcomes from a longitudinal perspective. *Child indicators research*, *4*(3), 413-437. • McKnight, A. (2015). Downward mobility, opportunity hoarding and the 'glass floor'. *London: Social Mobility and Child Poverty Commission*.

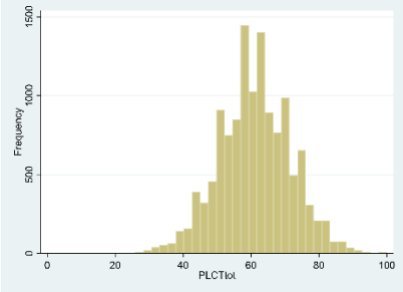
4.4.2 Friendly Maths Test

BCS70 Age 10 (1980): Friendly Maths Test	
Domain:	Mathematics
Measures:	Mathematical competence, ranging from early awareness of number operations to expected mathematics ability at 13 years old, including arithmetic, number skills, fractions, measures, algebra, geometry and statistics.
CHC:	Gq (Quantitative Knowledge)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 10 Survey (1980).
Administration method:	In schools; pen and paper
Procedure:	The test consisted of a total of 72 multiple choice questions covering a full range of mathematical competencies: • Basic arithmetic skills (36 items) • Measures (16 items) • Algebra (6 items) • Geometry (10 items) • Statistics (4 items) Within each of the areas covered, the questions increased in difficulty as the test proceeded. The test was stopped if the child failed six consecutive items. Duration: 30 minutes
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2018/06/Friendly-maths-test-annotated.pdf
Scoring:	A score of 1 was given for each correct answer over the 72 items

BCS70 Age 10 (1980): Friendly Maths Test	
Item-level variable(s):	i4001 – i4072
Total score/derived variable(s):	BD3MATHS Explore these variables in Discovery: BCS70 Friendly Maths Test (1980) Dataset
Age of participants (months):	Mean = 121.88, SD = 2.67, Range = 117 - 139
Descriptives:	N = 11,633 Range = 1 - 72 Mean = 43.95 SD = 12.32 
Other sweep and/or cohort:	None
Source:	Specifically designed for BCS70 age 10, due to a lack of a fully acceptable mathematics test appropriate for ten-year-olds at the time (see paper in "Technical Resources" below for more information about the test development).
Technical resources:	Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf
Example articles:	• Siegler, R. S., Duncan, G. J., Davis-Kean, P. E., Duckworth, K., Claessens, A., Engel, M., ... & Chen, M. (2012). Early predictors of high school mathematics achievement. *Psychological Science*, *23*(7), 691-697. • McKnight, A. (2015). Downward mobility, opportunity hoarding and the 'glass floor'. *London: Social Mobility and Child Poverty Commission*.

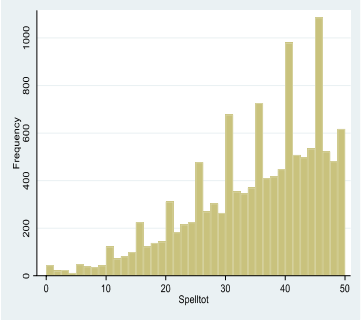
4.4.3 Pictorial Language Comprehension Test (PLCT)

BCS70 Age 10 (1980): Pictorial Language Comprehension Test (PLCT)	
Domain:	Verbal
Measures:	Language comprehension, covering vocabulary, sequence and sentence comprehension.
CHC:	Gc (Crystallised ability)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 10 Survey (1980)
Administration method:	In schools, pen and paper
Procedure:	The test consisted of 100 sets of four different pictures with a particular word or sentence associated with each set of four pictures. There were 71 vocabulary items, 16 sentence items and 13 sequence-sentence items. For the vocabulary and sentence items, the child was asked to indicate the one picture that corresponded to the given word or sentence. For the sequence-sentence items, the child was asked to indicate to the pictures in the order that was implied in the sentence. For the 71 vocabulary items only, the test increased in difficulty and continued until the child had five successive failures. All 39 sentence and sequence-sentence items were administered. Duration: 30 minutes
Link to questionnaire:	https://doc.ukdataservice.ac.uk/doc/3723/mrdoc/pdf/a3723ueb.pdf (page 50)
Scoring:	100 items, consisting of 71 vocabulary items, 16 sentence items and 13 sequence-sentence items. One point for each correct answer.
Item-level variable(s):	• i8 – i62, i66 – i81 (vocabulary items) • i82 – i97 (sentence items) • i98 – i110 (sequence-sentence items)
Total score/derived variable(s):	None
Age of participants (months):	Mean = 121.88, SD = 2.67, Range = 117 - 139
Descriptives:	N = 12,790 Range = 2 - 100

BCS70 Age 10 (1980): Pictorial Language Comprehension Test (PLCT)	
	Mean = 61.10 SD = 10.69 
Other sweep and/or cohort:	• BCS70 (age 5) - English Picture Vocabulary Test with 56 items • NCDS (children of cohort member, multi-age) – Peabody Picture Vocabulary Test
Source:	Based on: English Picture Vocabulary Test (EPVT; Brimmer & Dunn, 1962)
Technical resources:	Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf
Example articles:	• Feinstein, L., & Bynner, J. (2004). The importance of cognitive development in middle childhood for adulthood socioeconomic status, mental health, and problem behavior. *Child Development*, *75*(5), 1329-1339. • Conti, G., & Heckman, J. J. (2010). Understanding the early origins of the education-health gradient: A framework that can also be applied to analyze gene-environment interactions. *Perspectives on Psychological Science*, *5*(5), 585-605.

4.4.4 Spelling Dictation Task (SDT)

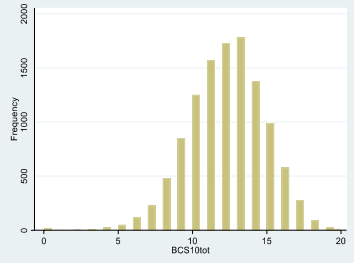
BCS70 Age 10 (1980): Spelling Dictation Task (SDT)	
Domain:	Verbal (spelling)
Measures:	Dictation task measuring spelling and phonetic decoding
CHC:	Gc (Crystallised ability) Ga (Auditory processing) Grw (Reading/Writing)

BCS70 Age 10 (1980): Spelling Dictation Task (SDT)	
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 10 Survey (1980).
Administration method:	In schools; pen and paper
Procedure:	A paragraph was dictated to the child including both real and made-up words. A sentence could be repeated once and an imaginary word in the middle of the passage could be repeated twice.
Link to questionnaire:	No direct link to questionnaire. Instructions, including the dictated paragraph, can be found in file 'a3723udb.pdf' (page 26) accompanying data download from UK Data Service or available at https://doc.ukdataservice.ac.uk/doc/3723/mrdoc/pdf/a3723udb.pdf. More information about the procedure can be found in the "Technical Resources" document below.
Scoring:	One point for each correct spelling of a real word and one point for each syllable of the made-up words. Maximum score = 50.
Item-level variable(s):	i3815 – i3864
Total score/derived variable(s):	None
Age of participants (months):	Mean = 121.88, SD = 2.67, Range = 117 - 139
Descriptives:	N = 12,489 Range = 0 - 50 Mean = 34.96 SD = 10.73 
Other sweep and/or cohort:	None
Source:	Unknown

BCS70 Age 10 (1980): Spelling Dictation Task (SDT)	
Technical resources:	Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf
Example articles:	• Miles, T. R., Wheeler, T. J., & Haslum, M. N. (2003). The existence of dyslexia without severe literacy problems. *Annals of Dyslexia*, *53*(1), 340-354.

4.4.5 British Abilities Scales (BAS): Word Similarities

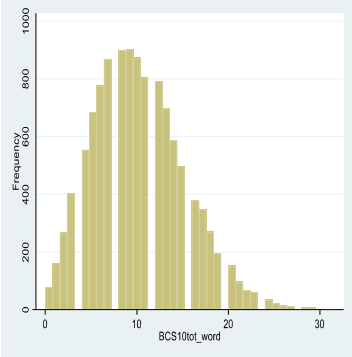
BCS70 Age 10 (1980): BAS Word Similarities	
Domain:	Verbal (reasoning)
Measures:	(Acquired) verbal knowledge and verbal reasoning: Verbal reasoning ability Expressive language skills, including verbal fluency Vocabulary knowledge General knowledge Abstract and logical thinking Ability to distinguish between essential and superficial features
CHC:	Gc (Crystallised ability)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 10 Survey (1980).
Administration method:	In schools; pen and paper.
Procedure:	The test consisted of 21 items made up of 3 words e.g. orange, banana, strawberry. The teacher read the three words and asked the child to name another word consistent with the group (a group example) i.e. another type of fruit. The child then had to say what the words had in common (a group name) i.e. they are all fruits. When the child was unable to name both a group example and group name on four successive attempts the test was stopped. Duration: Total 30 minutes for 4 BAS tests
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2018/06/British-ability-scales-annotated.pdf
Scoring:	One point for every group example *and* group name, but zero points if only one was correct, giving a maximum score of 21.

BCS70 Age 10 (1980): BAS Word Similarities	
Item-level variable(s):	• i3575 – i3616 (Item responses) • i4201 – i4221 (group example and group name correct)
Total score/derived variable(s):	None
Age of participants (months):	Mean = 121.88, SD = 2.67, Range = 117 - 139
Descriptives:	N = 11,482 Range = 0 - 20 Mean = 12.06 SD = 2.61 
Other sweep and/or cohort:	• MCS5 (age 11) – the revised BASII version. • ALSPAC (age 4 and 8.5) – verbal similarities asked slightly differently
Source:	• Elliott, C. D., Murray, D. J., & Pearson, L. S. (1979). *British Ability Scales*, Slough: NFER. • Elliott, C., Murray, D., & Pearson, L. (1978). *British Ability Scales*. Windsor: National Foundation for Educational Research.
Technical resources:	Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf
Example articles:	• Case, A., & Paxson, C. (2008). Stature and status: Height, ability, and labor market outcomes. *Journal of political Economy*, *116*(3), 499-532. • Gregg, P., & Macmillan, L. (2010). Family income, education and cognitive ability in the next generation: exploring income gradients in education and test scores for current cohorts of youth. *Longitudinal and Life Course Studies*, *1*(3), 259-280. • Sturgis, P., Read, S., & Allum, N. (2010). Does intelligence foster generalized trust? An empirical test using the UK birth cohort

BCS70 Age 10 (1980): BAS Word Similarities
studies. *Intelligence*, *38*(1), 45-54.

4.4.6 BAS: Word Definitions

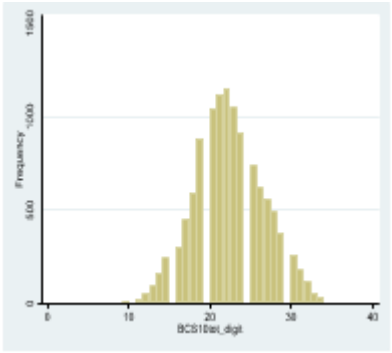
BCS70 Age 10 (1980): BAS Word Definitions	
Domain:	Verbal knowledge (acquired and expressive)
Measures:	Verbal ability: • Vocabulary knowledge • Expressive language skills, including verbal fluency • General knowledge • Verbal conceptualisation • Abstract thinking • Retrieval of information from long-term memory • Level of language stimulation (may depend on experience as well as education) Low scores may be generally attributable to: • Poor verbal development • Disadvantaged environmental circumstances
CHC:	Gc (Crystallised intelligence)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 10 Survey (1980).
Administration method:	In schools; pen and paper
Procedure:	The teacher was presented with a list of 37 words. Each word was orally presented to the child who was asked what the word meant. E.g. "SPORT"; "What does SPORT mean?". The words increased in difficulty as the test progressed. Items were scored as correct or incorrect according to whether or not the child expressed key concepts of the word's meaning. The assessment was stopped after four successive incorrect or partially incorrect words. Duration: Total 30 minutes for 4 BAS tests
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2018/06/British-ability-scales-annotated.pdf

BCS70 Age 10 (1980): BAS Word Definitions	
Scoring:	37 items, the child received 1 point for each correct answer.
Item-level variable(s):	i3504 – i3540
Total score/derived variable(s):	None
Age of participants (months):	Mean = 121.88, SD = 2.67, Range = 117 - 139
Descriptives:	N = 11,526 Range = 0 - 32 Mean = 10.13 SD = 5.01 
Other sweep and/or cohort:	• NSHD (Age 8 and 11) – similar National Foundation for Educational Research (NFER) task • ALSPAC (Age 8)
Source:	• Elliott, C. D., Murray, D. J., & Pearson, L. S. (1979). *British Ability Scales*, Slough: NFER. • Elliott, C., Murray, D., & Pearson, L. (1978). *British Ability Scales*. Windsor: National Foundation for Educational Research.
Technical resources:	Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf
Example articles:	• Bennett, K. E., & Haggard, M. P. (1999). Behaviour and cognitive outcomes from middle ear disease. *Archives of Disease in Childhood*, *80*(1), 28-35. • Connelly, R., & Gayle, V. (2019). An investigation of social class inequalities in general cognitive ability in two British birth cohorts.

BCS70 Age 10 (1980): BAS Word Definitions
The British journal of sociology,70(1), 90-108.

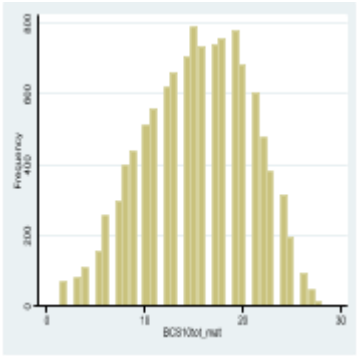
4.4.7 BAS: Recall of Digits

BCS70 Age 10 (1980): BAS Recall of Digits	
Domain:	Short-term auditory memory
Measures:	Short term auditory sequential recall: • Short-term auditory memory • Facility in verbal expression • Concentration and attention Low scores: • Use of inappropriate strategies for storage or retrieval of numbers
CHC:	Gsm (working memory)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 10 Survey (1980).
Administration method:	In school, administered by teacher.
Procedure:	The teacher was presented with 34 items. For each item the teacher read out digits and asked the child to repeat them. The exercise increased in difficulty from remembering and repeating two digits (e.g. 5, 4) to three digits (e.g. 5, 6, 4) and then up to eight digits (e.g. 3, 8, 8, 7, 8, 4, 4, 6). If the child asked for a repeat of the numbers, the teacher repeated the series of numbers but the subsequent answer was scored as incorrect. The test was stopped after four consecutive incorrect responses. For more details, see "Technical Resources" below. Duration: Total 30 minutes for 4 BAS tests
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2018/06/British-ability-scales-annotated.pdf
Scoring:	34 items, 1 point for each correct recall
Item-level variable(s):	i3541 – i3574
Total score/derived variable(s):	None

BCS70 Age 10 (1980): BAS Recall of Digits	
Age of participants (months):	Mean = 121.88, SD = 2.67, Range = 117 - 139
Descriptives:	N = 11,512 Range = 1 - 34 Mean = 22.40 SD = 4.28 
Other sweep and/or cohort:	• NCDS (children of cohort member, multi-age) • ALSPAC (age 5)
Source:	• Elliott, C. D., Murray, D. J. & Pearson, L. S. (1979). *British Ability Scales*, Slough: NFER. • Elliott, C., Murray, D., & Pearson, L. (1978). *British Ability Scales*. Windsor: National Foundation for Educational Research.
Technical resources:	Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf
Example articles:	• Montgomery, S. M., Ehlin, A., & Sacker, A. (2006). Pre- pubertal growth and cognitive function. *Archives of disease in childhood*, 91(1), 61-62. • Gale, C. R., Hatch, S. L., Batty, G. D., & Deary, I. J. (2009). Intelligence in childhood and risk of psychological distress in adulthood: the 1958 National Child Development Survey and the 1970 British Cohort Study. *Intelligence*, 37(6), 592-599.

4.4.8 BAS: Matrices

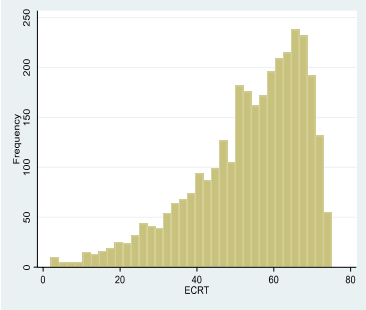
BCS70 Age 10 (1980): BAS Matrices	
Domain:	Inductive, non-verbal reasoning
Measures:	Non-verbal reasoning: • Non-verbal inductive reasoning, including identification of the rules governing variables in abstract figures, and formulation and testing of hypotheses about these rules • Use of verbal mediation strategies involving labelling of figures • Visuo-spatial analysis, including perception of shape, relative size and orientation Low score: • Poor understanding of verbal instructions or visual cues
CHC:	Gf (Fluid intelligence)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 10 Survey (1980)
Administration method:	In school, pen and paper
Procedure:	The task consisted of 28 incomplete patterns arrayed as a grid (a matrix). Each matrix was a square consisting of four or nine cells, with a blank cell in the lower right corner. The teacher asked the child to complete each item by drawing the appropriate shape in the empty square. There were seven example items, three at the start of the exercise, then four examples when the level of difficulty increased. The task was stopped when four successive items were drawn incorrectly or when it was apparent that the level of difficulty was too great. For more details, see "Technical Resources" below. Duration: Total 30 minutes for 4 BAS tests
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2018/06/British-ability-scales-annotated.pdf
Scoring:	28 items, 1 point for each correct drawing
Item-level variable(s):	i3617 – i3644
Total score/derived variable(s):	None

BCS70 Age 10 (1980): BAS Matrices	
Age of participants (months):	Mean = 121.88, SD = 2.67, Range = 117 - 139
Descriptives:	N = 11,494 Range = 0 - 28 Mean = 15.35 SD = 5.40 
Other sweep and/or cohort:	• BCS70 (age 16) – but fewer items (11 v 28) and different format (multi-choice v drawing) • ALSPAC (age 15.5) – similar
Source:	• Elliott, C. D., Murray, D. J. & Pearson, L. S. (1979). *British Ability Scales*, Slough: NFER. • Elliott, C., Murray, D., & Pearson, L. (1978). *British Ability Scales*. Windsor: National Foundation for Educational Research.
Technical resources:	Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf
Example articles:	• Deary, I. J., Batty, G. D., & Gale, C. R. (2008). Bright children become enlightened adults. *Psychological Science*, 19(1), 1-6. • Bourne, M., Bukodi, E., Betthäuser, B., & Goldthorpe, J. • H. (2018). 'Persistence of the social': The role of cognitive ability in mediating the effects of social origins on educational attainment in Britain. *Research in Social Stratification and Mobility*, 58, 11-21.

4.5 BCS70 Age 16 (1986)

4.5.1 Edinburgh Reading Test (Shortened Version)

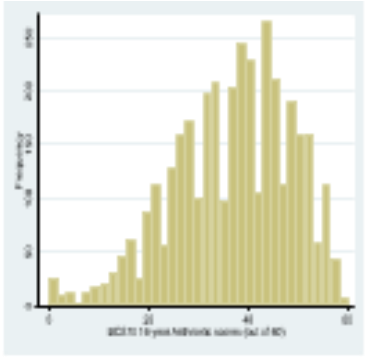
BCS70 Age 16 (1986): Edinburgh Reading Test (Shortened Version)	
Domain:	Verbal (reading)
Measures:	Reading skills, and includes five sub-scales examining vocabulary, syntax, sequencing, comprehension and retention.
CHC:	Gc (Crystallised ability) Grw (Reading/Writing)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 16 Survey (1986).
Administration method:	In school; pen and paper; (not included in the home version of the Education Pack).
Procedure:	75 question items in total, made up of 5 sections. • Section A: Skimming; the child skim read a recipe and responded to multiple choice questions (10 items) • Section B: Vocabulary; the child selected one from five words with the same meaning as the underlined word in a sentence (20 items) • Section C: the child read a passage and decided whether the statements agreed or disagreed with the passage (15 items) • Section D: the child read 2 different sets of 5 opinions one set at a time and indicated who of the 5 were most likely to state particular opinions (17 items) • Section E: the child read 2 different passages; after reading each one at a time the child chose from a number of options to complete an item to reproduce the sense of the passage (13 items) • Skimming (3 mins), vocabulary (11 mins), reading for facts (5-8 mins), points of view (12 mins) and comprehension (12 mins). Duration: 5 sections each with time limits - total 44 minutes
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-16-year-Document-B.pdf
Scoring:	75 items, 1 point for each correct answer. Overall and 5 sub-scale scores for skimming (10 items), vocabulary (20 items), reading for facts (15 items), points of view (17 items) and comprehension (13 items).
Item-level variable(s):	• SCR_A1 – SCR_A10 (skimming) • SCR_B1 – SCR_B20 (vocabulary) • SCR_C1 – SCR_C15 (reading for facts) • SCR_D1 – SCR_D17 (points of view)

BCS70 Age 16 (1986): Edinburgh Reading Test (Shortened Version)	
	• SCR_E1 – SCR_E13 (comprehension)
Total score/derived variable(s):	• SCR_A • SCR_B • SCR_C • SCR_D • SCR_E • SCRTOTAL* *excludes cohort members who did not answer all sections of the test
Age of participants (months):	Mean = 191.28, SD = 1.17, Range = 191 - 206 (N: 2148)* *Derived from completion date of document F
Descriptives:	N = 3,108 Range = 6 - 75 Mean = 54.49 SD = 13.41 
Other sweep and/or cohort:	• BCS70 (age 10) – age 10 test adapted for 16-year-olds
Source:	Shortened version developed from Edinburgh Reading Test by Godfrey Thompson Unit (GTU) and BCS70 survey team especially for the BCS70 at age 10. GTU (1978) Edinburgh Reading Test. Sevenoaks: Hodder and Stoughton.
Technical resources:	• Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf • Seabrook, G. & Murphy, T. (2017). Reading and Matrices Tests BCS4 (1986), CLS Data note. https://doc.ukdataservice.ac.uk/doc/8288/mrdoc/pdf/bcs70_1986_reading_and_matrices_tests_data_note.pdf

BCS70 Age 16 (1986): Edinburgh Reading Test (Shortened Version)	
Example articles:	• Sullivan, A., Parsons, S., Wiggins, R., Heath, A., & Green, F. (2014). Social origins, school type and higher education destinations. *Oxford Review of Education*, 40(6), 739-763. • Parsons, S., Green, F., Ploubidis, G. B., Sullivan, A., & Wiggins, R. D. (2017). The influence of private primary schooling on children's learning: Evidence from three generations of children living in the UK. *British Educational Research Journal*, 43(5), 823- 847.

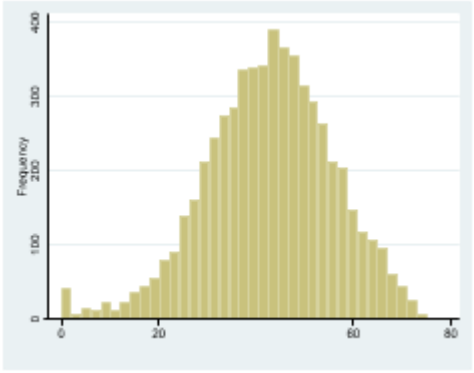
4.5.2 APU (Applied Psychological Unit) Arithmetic Test

BCS70 Age 16 (1986): APU Arithmetic Test	
Domain:	General arithmetic achievement
Measures:	General arithmetic attainment (and not aptitude). Designed to test arithmetic concepts through calculation. Covers evaluation of arithmetic expressions, knowledge of proportion, percentage, estimation of area and simple probability. It tests the ability to reproduce and therefore the aptitude to learning arithmetic processes.
CHC:	Gq (Quantitative Knowledge)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 16 Survey (1986).
Administration method:	In school; pen and paper (Not included in the home version of the Education Pack).
Procedure:	Multiple-choice: each question had five possible answers, only one of which was correct. The test gets progressively harder, starting with simple addition, multiplication, division and subtraction questions and ending with more complex mathematical calculations and problems to solve. Duration: 30 minutes
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-16-year-Document-B.pdf
Scoring:	60 items, 1 point for each correct response
Item-level variable(s):	• car1 – car60 (original response) • carx1 – carx60 (individual derived)
Total score/derived	• mathscore (raw total) • mathincorrect (number incorrect)

BCS70 Age 16 (1986): APU Arithmetic Test	
variable(s):	• mathanswered (number attempted)
Age of participants (months):	Mean = 194.04, SD = 1.45, Range = 191 - 206
Descriptives:	N = 3,677 Range = 0 - 60 Mean = 36.77 SD = 11.82 
Other sweep and/or cohort:	None
Source:	Closs, S. J. & Hutchings, M. J. (1976). APU arithmetic test, London: Hodder and Stoughton.
Technical resources:	• Dodgeon, B. (2008). Guide to the Dataset: BCS70 16 year follow up: APU arithmetic test, London: Centre for Longitudinal Studies. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/bcs70_16-year_arithmetic_test_-_guide_to_the_dataset.pdf • Levy, P. & Goldstein, H. *(1984). Tests in Education: a book of critical reviews. London: Academic Press.* • Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf
Example articles:	• Siegler, R. S., Duncan, G. J., Davis-Kean, P. E., Duckworth, K., Claessens, A., Engel, M., ... & Chen, M. (2012). Early predictors of high school mathematics achievement. *Psychological Science*, *23*(7), 691-697. • Sullivan, A., Parsons, S., Wiggins, R., Heath, A., & Green, F. (2014). Social origins, school type and higher education destinations. *Oxford Review of Education*, *40*(6), 739-763.

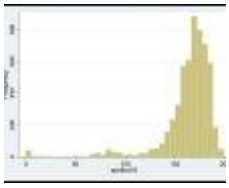
4.5.3 APU Vocabulary Test

BCS70 Age 16 (1986): APU Vocabulary Test	
Domain:	Verbal (vocabulary)
Measures:	Vocabulary, meaning of words. Word knowledge
CHC:	Gc (Crystallised ability)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 16 Survey (1986).
Administration method:	Administered in schools and home version of the Education Pack. (variable 'bversion' identifies if administered at school (0) or home (1)) Timed conditions; Pen and paper
Procedure:	75 words in the test. Each word was followed by a multiple- choice list of 5 words from which the respondent picked the one with the same meaning as the first word. The test got progressively harder. Duration: 15 minutes
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-16-year-Document-B.pdf
Scoring:	75 items; 1 point for each correct response
Item-level variable(s):	cvo1 – cvo75
Total score/derived variable(s):	• BD4RREAD* • BD4READ* • BD4RDAGE* *variables may have been updated, please check carefully
Age of participants (months):	Mean = 196.72, SD = 4.49, Range = 189 - 212, (N: 3,967)* *Based on school sample only
Descriptives:	N = 5,756 Range = 0 - 75 Mean = 42.62 SD = 12.81

BCS70 Age 16 (1986): APU Vocabulary Test	
	
Other sweep and/or cohort:	• BCS70 (age 42) – shortened version (20 items) • MCS (age 14) – shortened version (20 items)
Source:	Closs, S. J. (1976). *APU vocabulary test (multiple choice format, 1986)*. Kent: Hodder and Stoughton Educational Ltd.
Technical resources:	• Levy P & Goldstein H. (1984). Tests in Education: a book of critical reviews. London: Academic Press. • Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf
Example articles:	• Mostafa, T., & Wiggins, R. (2015). The impact of attrition and non-response in birth cohort studies: a need to incorporate missingness strategies. *Longitudinal and Life Course Studies*, *6*(2), 131-146. • Sullivan, A., & M. Brown. (2015). Reading for pleasure and children's progress in vocabulary and mathematics. *British Educational Research Journal* 41(6):971-991. • Sullivan, A., & Matthew B. (2015). Vocabulary from adolescence to middle age. *Longitudinal and Life Course Studies* 6(2):173-189.

4.5.4 Spelling Test

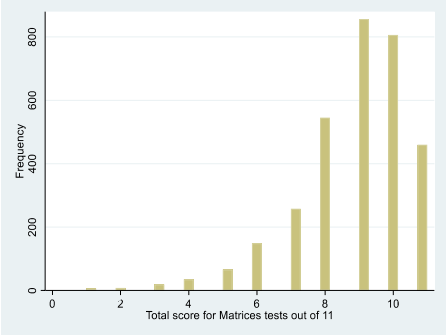
BCS70 Age 16 (1986): Spelling Test	
Domain:	Verbal (spelling)
Measures:	Spelling
CHC:	Grw (Reading/Writing)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 16 Survey (1986).

BCS70 Age 16 (1986): Spelling Test	
Administration method:	Administered in schools and home version of the Education Pack. (variable 'bversion' identifies if administered at school (0) or home (1)). Time limits apply.
Procedure:	Spelling was assessed by two tests (A and B). 100 words for each test - some spelt correctly and some incorrectly, CM identifies whether correct or incorrect. The words get harder as the test progresses. Order of test rotated by odd and even days. Duration: 20 minutes, 10 minutes. each section (A&B)
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-16-year-Document-B.pdf
Scoring:	200 in total, 1 point for each correct answer
Item-level variable(s):	• c7a1 – c7a100 (Test A) • c7b1 – c7b100 (Test B)
Total score/derived variable(s):	None
Age of participants (months):	Mean = 189.36, SD = 4.27, Range = 189 - 213 (N: 3,463)* *Based on school sample only
Descriptives:	N = 5,649 Range = 0 - 199 Mean = 162.71 SD = 28.26 
Other sweep and/or cohort:	None
Source:	Unknown
Technical resources:	Parsons, S. (2014) Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf
Example articles:	• Sullivan, A. (2006). Academic self-concept, gender and single- sex schooling in the 1970 British Cohort Study. *CLS Working Paper*.

BCS70 Age 16 (1986): Spelling Test	
	• Sullivan, A., Parsons, S., Wiggins, R., Heath, A., & Green, F. (2014). Social origins, school type and higher education destinations. *Oxford Review of Education*, *40*(6), 739-763.

4.5.5 British Abilities Scales (BAS): Matrices

BCS70 Age 16 (1986): BAS Matrices	
Domain:	Inductive, non-verbal reasoning
Measures:	Non-verbal reasoning: • Non-verbal inductive reasoning, including identification of the rules governing variables in abstract figures, and formulation and testing of hypotheses about these rules • Use of verbal mediation strategies involving labelling of figures • Visuo-spatial analysis, including perception of shape, relative size and orientation Low score: Poor understanding of verbal instructions or visual cues
CHC:	Gf (Fluid ability)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 16 Survey (1986).
Administration method:	In schools (not included in the home version of the Education Pack); pen and paper.
Procedure:	Each matrix was a square consisting of four or nine cells, with a blank cell in the lower right corner of each matrix. From five alternatives the child chose the design that correctly completes the matrix. There were six example items, three at the start of the exercise, then three examples when the level of difficulty increased. The child entered their choice of answer in the space provided on a separate 'Student Score Form'. Duration: 7 minutes
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-16-year-Document-B.pdf
Scoring:	11 items, 1 point for each correct choice, -1 not answered
Item-level variable(s):	• ANS_M1 - ANS_M11 (item selected) • SCR_M1 - SCR_M11 (1 = correct, 0 = wrong, -1 = not answered)

BCS70 Age 16 (1986): BAS Matrices	
Total score/derived variable(s):	SCR_M (total score)
Age of participants (months):	Mean = 193.99, SD = 1.29, Range = 191 - 206 (N: 2458)
Descriptives:	N = 3,208 Range = 1 - 11 Mean = 8.86 SD = 1.67 
Other sweep and/or cohort:	• BCS70 (age 10) – but more items at age 10 (28 v 11) and different format (drawing v multi-choice) • ALSPAC (age 15.5) similar
Source:	• Elliott, C. D., Murray, D. J., & Pearson, L. S. (1979). *British Ability Scales*, Slough: NFER. • Elliott, C., Murray, D., and Pearson, L. (1978). *British Ability Scales*. Windsor: National Foundation for Educational Research.
Technical resources:	• Parsons, S. (2014). Childhood cognition in the 1970 British Cohort Study, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-Childhood-cognition-in-the-1970-British-Cohort-Study-Nov-2014-final.pdf • Seabrook, G., & Murphy, T. (2017). Reading and Matrices Tests BCS4 (1986), CLS Data note. https://doc.ukdataservice.ac.uk/doc/8288/mrdoc/pdf/bcs70_1986_reading_and_matrices_tests_data_note.pdf
Example articles:	• Sullivan, A., Parsons, S., Wiggins, R., Heath, A., & Green, F. (2014). Social origins, school type and higher education destinations. *Oxford Review of Education*, *40*(6), 739-763. • Parsons, S., Green, F., Ploubidis, G. B., Sullivan, A., & Wiggins, R. • D. (2017). The influence of private primary schooling on children's

BCS70 Age 16 (1986): BAS Matrices	
	learning: Evidence from three generations of children living in the UK. *British Educational Research Journal*, *43*(5), 823-847.

4.6 BCS70 cohort members' child (multi-age, 2004)

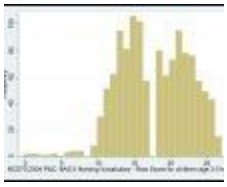
When the Cohort Member (CM) was aged 34, child assessments were conducted with the CM's children. Each of the CM's eligible children was asked to complete three exercises designed to measure a range of verbal and numerical abilities. Although dependent on the child's age and abilities, each set of exercises was expected to take an average of 20 minutes to complete.

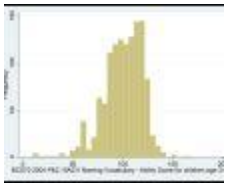
Appropriate exercises were used for different age groups:

- Early Years exercises (age 3 years - 5 years and 11 months)
  - Naming Vocabulary
  - Early Number Concepts
  - Copying Designs
- School Age exercises (age 6 years - 16 years and 11 months)
  - Word Reading
  - Number Skills
  - Spelling

4.6.1 British Abilities Scales II (BAS II) Early Years Battery: Naming Vocabulary

BCS70 CM child (multi-age; 2004): BAS II Early Years Battery: Naming Vocabulary	
Domain:	Verbal knowledge (expressive)
Measures:	Spoken vocabulary: • Expressive language skills • Vocabulary knowledge of nouns • Ability to attach verbal labels to pictures • General knowledge • General language development • Retrieval of names from long-term memory • Level of language stimulation
CHC:	Gc (Crystallised ability)
CLOSER Source:	Not currently available in CLOSER Discovery

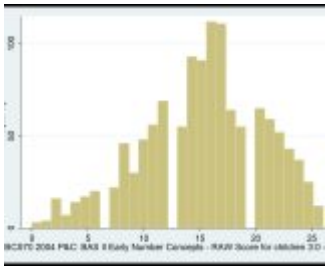
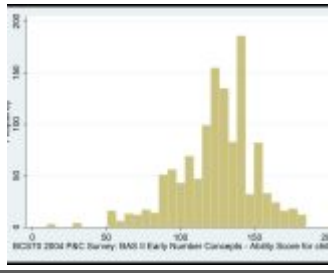
BCS70 CM child (multi-age; 2004): BAS II Early Years Battery: Naming Vocabulary	
Administration method:	During Parent and Child Interview; Shown picture, child responds verbally, recorded on Computer Assisted Personal Interviewing (CAPI)
Procedure:	The test items consisted of coloured pictures of objects shown to the child one at a time. The child was asked to name the object in the picture e.g. a picture of a shoe, or a chair. There were 36 pictures in total, but the number of items a child answered depended on their performance. Starting and stopping points were based on different ages and performance, but generally, the better a child did, the more items were administered. These 'rules' were programmed into the computer to minimise the decisions interviewers had to make on the spot. More details can be found in the user guide (in "Link to questionnaire" below) on page 8 and in Appendix A1.
Link to questionnaire:	No link to the questionnaire, but user guide available: https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-2004-Guide-to-Child-Assessments.pdf
Scoring:	36 items (pictures of objects) in total; correct answers were scored one point each. Starting and stopping item depended on age and performance. Raw scores were then adjusted to account for age and ability.
Item-level variable(s):	basnv01 – basnv36
Total score/derived variable(s):	• basnvR (raw score) • basnvA (ability and age adjusted)
Age of participants (months):	Mean = 58.86, SD = 10.58, Range = 36 - 71
Descriptives:	basnvR (raw score): N = 1,238 Range = 0 - 27 Mean = 17.74 SD = 4.80 

BCS70 CM child (multi-age; 2004): BAS II Early Years Battery: Naming Vocabulary	
	basnvA (ability and age adjusted): N = 1,238 Range = 10 - 170 Mean = 99.69 SD = 19.38 
Other sweep and/or cohort:	• MCS (age 3) • MCS (age 5) • ALSPAC (age 2): similar task involving objects
Source:	• Elliott, C. D., Smith, P., & McCulloch, K. (1996). British Ability Scales Second Edition (BAS II). Administration and Scoring Manual. London: Nelson. • Elliott, C. D., Smith, P., & McCulloch, K. (1997). British Ability Scales Second Edition (BAS II). Technical Manual. London: Nelson.
Technical resources:	• Parsons, S., Bynner, J., & Foudouli, V. (2005). Measuring basic skills for longitudinal study: the design and development of instruments for use with cohort members in the age 34 follow- up in the 1970 British Cohort Study. NRDC: London. https://discovery.ucl.ac.uk/id/eprint/10004767/1/Bynner2005Measuring.pdf • Parsons, S. (2006). British Cohort Study 2004 Follow up: Guide to Child Assessment Data, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-2004-Guide-to-Child-Assessments.pdf
Example articles:	• Cooksey, E., Joshi, H., & Verropoulou, G. (2009). Does mothers' employment affect children's development? Evidence from the children of the British 1970 Birth Cohort and the American NLSY79. *Longitudinal and Life Course Studies*, *1*(1), 95–115. • Crawford, C., Goodman, A., & Joyce, R. (2011). Explaining the socio-economic gradient in child outcomes: the inter-generational transmission of cognitive skills. *Longitudinal and Life Course Studies*, *2*(1), 77-93. • de Coulon, A., Meschi, E., & Vignoles, A. (2011). Parents' skills and children's cognitive and non-cognitive outcomes. *Education*

BCS70 CM child (multi-age; 2004): BAS II Early Years Battery: Naming Vocabulary
economics, *19*(5), 451-474.

4.6.2 BAS II Early Years Battery: Early Number Concepts

BCS70 CM child (multi-age; 2004): BAS II Early Years Battery: Early Number Concepts	
Domain:	Pictorial reasoning
Measures:	Verbal and visuo-spatial processing: • Knowledge of numerical and pre-numerical concepts • Verbal comprehension • Knowledge of basic language concepts • Visual perception and analysis of pictures • Integration of visual and conceptual information
CHC:	Gf (Fluid ability)
CLOSER Source:	Not currently available in CLOSER Discovery
Administration method:	Pointing or counting in response to plastic tiles and responses to colour pictures in a booklet. Recorded by interviewer on computer-assisted personal interview (CAPI).
Procedure:	The child answered questions about number, size, or other numerical concepts. Stimuli used for the exercises included ten green plastic tiles and a series of pictures presented to the child, with 30 questions in total. A number of questions were asked for each of the pictures. There were different starting and stopping points dependent upon age and performance. Starting and stopping points based on different ages and performance. These 'rules' were programmed into the computer to minimise the decisions interviewers had to make on the spot. More details can be found in the user guide (in "Link to questionnaire" below) on page 8 and in Appendix A2.
Link to questionnaire:	No link to the questionnaire, but user guide available: https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-2004-Guide-to-Child-Assessments.pdf
Scoring:	30 questions in total. Starting and stopping item depends on age and performance. Score 1=correct, 2=incorrect, except item 3 (counting tiles) which was scored 0 – 6.

BCS70 CM child (multi-age; 2004): BAS II Early Years Battery: Early Number Concepts	
Item-level variable(s):	basenc01 – basenc30
Total score/derived variable(s):	• basencR (raw score) • basencA (ability and age adjusted)
Age of participants (months):	Mean = 53.95, SD = 10.56, Range = 36 - 71
Descriptives:	basencR (raw score): N = 1,226 Range = 0 - 26 Mean = 15.33 SD = 5.41  basencA (ability and age adjusted): N = 1,226 Range = 10 - 185 Mean = 124.39 SD = 26.47 
Other sweep and/or cohort:	None
Source:	• Elliott, C. D., Smith, P., & McCulloch, K. (1996). British Ability Scales Second Edition (BAS II). Administration and Scoring Manual. London: Nelson. • Elliott, C. D., Smith, P., & McCulloch, K. (1997). British Ability Scales Second Edition (BAS II). Technical Manual. London: Nelson

BCS70 CM child (multi-age; 2004): BAS II Early Years Battery: Early Number Concepts	
Technical resources:	• Parsons, S., Bynner, J., & Foudouli, V. (2005). Measuring basic skills for longitudinal study: the design and development of instruments for use with cohort members in the age 34 follow-up in the 1970 British Cohort Study. NRDC: London https://discovery.ucl.ac.uk/id/eprint/10004767/1/Bynner2005Measuring.pdf • Parsons, S. (2006). British Cohort Study 2004 Follow up: Guide to Child Assessment Data, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-2004-Guide-to-Child-Assessments.pdf
Example articles:	• Cooksey, E., Joshi, H., & Verropoulou, G. (2009). Does mothers' employment affect children's development? Evidence from the children of the British 1970 Birth Cohort and the American NLSY79. *Longitudinal and Life Course Studies*, *1*(1), 95–115. • Crawford, C., Goodman, A., & Joyce, R. (2011). Explaining the socio-economic gradient in child outcomes: the inter- generational transmission of cognitive skills. *Longitudinal and Life Course Studies*, *2*(1), 77-93. • de Coulon, A., Meschi, E., & Vignoles, A. (2011). Parents' skills and children's cognitive and non-cognitive outcomes. *Education Economics*, *19*(5), 451-474. • Mallows, D. (2013). The intergenerational transfer of numeracy skills. *Institute of Education, University of London*.

4.6.3 Copying Designs Test (CDT)

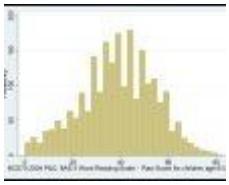
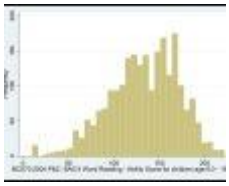
BCS70 CM child (multi-age; 2004): Copying Designs Test (CDT)	
Domain:	Visual spatial
Measures:	Ability to reproduce shapes
CHC:	Gv (Visual processing)
CLOSER Source:	Not currently available in CLOSER Discovery
Administration method:	Child shown picture on computer-assisted personal interview (CAPI), draws design in booklet

BCS70 CM child (multi-age; 2004): Copying Designs Test (CDT)	
Procedure:	The child was shown a series of 8 line drawings and asked to make two copies of the shape, as accurately as possible. There were no discontinuation rules, interviewers were asked to encourage the child to attempt all eight designs, but should stop if the child was distressed or if they stopped attempting to copy. (This exercise was not part of the BAS II, but had been completed by the cohort members themselves when they were age 5.)
Link to questionnaire:	No link to the questionnaire, but user guide available: https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-2004-Guide-to-Child-Assessments.pdf
Scoring:	Each drawing was scored 0 or 1. Neatness was not considered, but the drawings must have been the correct general shape, approximately symmetrical, not rotated, and with lines approximately meeting. As not all children completed two copies a score of 1 was given if at least one copy is good. Total score is the sum of the score for the individual drawings. More information about the scoring is available in the "Link to questionnaire" document, in Appendix A3.
Item-level variable(s):	No data available (tests not coded)
Total score/derived variable(s):	None
Age of participants (months):	No data available
Descriptives:	None
Other sweep and/or cohort:	• BCS70 (age 5) – cohort member themselves • NCDS (age 7) • NCDS (age 11) - 6 designs
Source:	Osborn, A. F., Butler, N. R., & Morris, A. C. (1984). The Social Life of Britain's Five Year Olds: A report of the Child Health and Education Study. London: Routledge and Kegan Paul.
Technical resources:	• Parsons, S., Bynner, J., & Foudouli, V. (2005). Measuring basic skills for longitudinal study: the design and development of instruments for use with cohort members in the age 34 follow- up in the 1970 British Cohort Study. NRDC: London.

BCS70 CM child (multi-age; 2004): Copying Designs Test (CDT)	
	https://discovery.ucl.ac.uk/id/eprint/10004767/1/Bynner2005Measuring.pdf • Parsons, S. (2006). British Cohort Study 2004 Follow up: Guide to Child Assessment Data, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-2004-Guide-to-Child-Assessments.pdf
Example articles:	None

4.6.4 BAS II School Aged Exercises: Word Reading

BCS70 CM child (multi-age; 2004): BAS II School Aged Exercises: Word Reading	
Domain:	School knowledge - reading (achievement scale)
Measures:	Word decoding ability: Recognition and oral reading of single words (lack of contextual clues): • Recognition of printed words • Visual and auditory working memory • Skills in word analysis without additional contextual clues • Vocabulary knowledge Low scores: • Poor visual memory • Short term auditory memory for sequences • Poor skills in phonological segmentation of words into component sounds or syllables • Poor skills in sound blending • Poor auditory discrimination
CHC:	Gc (Crystallised ability) Grw (Reading/Writing)
CLOSER Source:	Not currently available in CLOSER Discovery
Administration method:	The child reads aloud a series of words presented on a card.
Procedure:	The assessment consisted of 90 words in total. The words were organised into 9 blocks of 10 words in ascending order of difficulty. The child was asked to read each word in a block out loud to the interviewer. The number of blocks of words the child was asked to

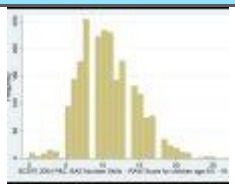
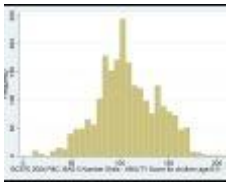
BCS70 CM child (multi-age; 2004): BAS II School Aged Exercises: Word Reading	
	attempt to read was dependent on the child's performance during the assessment. This assessment was designed to be used with children aged from 5 years to 17 years and 11 months.
Link to questionnaire:	No link to the questionnaire, but user guide available: https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-2004-Guide-to-Child-Assessments.pdf
Scoring:	90 maximum possible score, 1 for each correctly pronounced word.
Item-level variable(s):	baswr01 – baswr90
Total score/derived variable(s):	• baswrR (raw score) • baswrA (ability and age adjusted)
Age of participants (months):	Mean = 117.71, SD = 32.97, Range = 72 - 203
Descriptives:	baswrR (raw score): N = 2,248 Range = 0 - 83 Mean = 38.84 SD = 15.38  baswrA (ability and age adjusted): N = 2,248 Range = 10 - 222 Mean = 133.30 SD = 37.86 
Other sweep and/or cohort:	• MCS (age 7) • NSHD (age 8 and 11) - similar National Foundation for Educational Research (NFER) task

BCS70 CM child (multi-age; 2004): BAS II School Aged Exercises: Word Reading	
Source:	• Elliott, C. D., Smith, P., & McCulloch, K. (1996). British Ability Scales Second Edition (BAS II). Administration and Scoring Manual. London: Nelson. • Elliott, C. D., Smith, P., & McCulloch, K. (1997). British Ability Scales Second Edition (BAS II). Technical Manual. London: Nelson.
Technical resources:	• Parsons, S., Bynner, J., & Foudouli, V. (2005). Measuring basic skills for longitudinal study: the design and development of instruments for use with cohort members in the age 34 follow-up in the 1970 British Cohort Study. NRDC: London https://discovery.ucl.ac.uk/id/eprint/10004767/1/Bynner2005Measuring.pdf • Parsons, S. (2006). British Cohort Study 2004 Follow up: Guide to Child Assessment Data, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-2004-Guide-to-Child-Assessments.pdf
Example articles:	• Cooksey, E., Joshi, H., & Verropoulou, G. (2009). Does mothers' employment affect children's development? Evidence from the children of the British 1970 Birth Cohort and the American NLSY79. *Longitudinal and Life Course Studies*, *1*(1), 95–115. • Crawford, C., Goodman, A., & Joyce, R. (2011). Explaining the socio-economic gradient in child outcomes: the inter- generational transmission of cognitive skills. *Longitudinal and Life Course Studies*, *2*(1), 77-93.

4.6.5 BAS II School Aged Exercises: Number Skills

BCS70 CM child (multi-age; 2004): BAS II School Aged Exercises: Number Skills	
Domain:	School knowledge - basic competence in arithmetic calculation (achievement scale)
Measures:	Acquired computational skills: • Ability to recognise and express the names of numerals • Arithmetic skills • Knowledge and understanding of basic number concepts
CHC:	Gq (Quantitative Knowledge)
CLOSER Source:	Not currently available in CLOSER Discovery

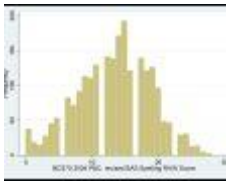
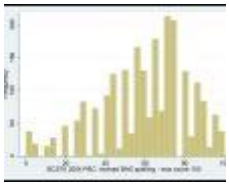
BCS70 CM child (multi-age; 2004): BAS II School Aged Exercises: Number Skills	
Administration method:	The numerical tasks were presented in a specially designed booklet.
Procedure:	The child was asked to perform basic arithmetic operations with whole numbers, common fractions and decimals and to convert fractions to decimals and percentages. The task was arranged in six blocks (A to F); the first four blocks consisted of eight items each, and the last two blocks had seven items each. The number of blocks a child attempted depended on the child's age and performance This assessment was designed to be used with children aged from 6 years to 17 years and 11 months, and for children aged 5 years to 5 years 11 months of above average ability.
Link to questionnaire:	No link to the questionnaire, but user guide available: https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-2004-Guide-to-Child-Assessments.pdf
Scoring:	46 items, starting and stopping points were different based on child's age. Start at age equivalent item, if < 5 were correct then starts on easier block until 5 or more items were correct. If 5 or more correct, then child moves to next batch until 3 or fewer items in a black were incorrect.
Item-level variable(s):	• basns01 – basns08 (age 5:0 - 7:11) • basns09 – basns16 (age 8:0 - 9:11) • basns17 – basns24 (age 10:0 - 11:11) • basns25 – basns32 (age 12 years 0 months – 17 years 11 months) • basns33 – basns46
Total score/derived variable(s):	• basnsR (raw score) • basnsA (ability and age adjusted)
Age of participants (months):	Mean = 117.65, SD = 32.95, Range = 72 - 203
Descriptives:	basnsR (raw score): N = 2,240 Range = 0 - 27 Mean = 10.68 SD = 3.93

BCS70 CM child (multi-age; 2004): BAS II School Aged Exercises: Number Skills	
	 basnsA (ability and age adjusted): N = 2,240 Range = 10 - 208 Mean = 107.36 SD = 31.59 
Other sweep and/or cohort:	None
Source:	• Elliott, C. D., Smith, P., & McCulloch, K. (1996). British Ability Scales Second Edition (BAS II). Administration and Scoring Manual. London: Nelson. • Elliott, C. D., Smith, P., & McCulloch, K. (1997). British Ability Scales Second Edition (BAS II). Technical Manual. London: Nelson. • *NB. Layout and symbols of the tests were adapted from BAS II to reflect change in curriculum since version of BAS was produced.*
Technical resources:	• Parsons, S., Bynner, J., & Foudouli, V. (2005). Measuring basic skills for longitudinal study: the design and development of instruments for use with cohort members in the age 34 follow- up in the 1970 British Cohort Study. NRDC: London. https://discovery.ucl.ac.uk/id/eprint/10004767/1/Bynner2005Measuring.pdf • Parsons, S. (2006). British Cohort Study 2004 Follow up: Guide to Child Assessment Data, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-2004-Guide-to-Child-Assessments.pdf
Example articles:	• Cooksey, E., Joshi, H., & Verropoulou, G. (2009). Does mothers' employment affect children's development? Evidence from the children of the British 1970 Birth Cohort and the American NLSY79. *Longitudinal and Life Course Studies*, *1*(1), 95–115. • Crawford, C., Goodman, A., & Joyce, R. (2011). Explaining the socio-

BCS70 CM child (multi-age; 2004): BAS II School Aged Exercises: Number Skills	
	economic gradient in child outcomes: the inter- generational transmission of cognitive skills. *Longitudinal and Life Course Studies*, *2*(1), 77-93.

4.6.6 BAS II School Aged Exercises: Spelling

BCS70 CM child (multi-age; 2004): BAS II School Aged Exercises: Spelling	
Domain:	School knowledge - spelling (achievement scale)
Measures:	Spelling achievement: • Visual memory for correct spelling of whole words • Knowledge of phoneme-to-grapheme mapping • Knowledge of spelling rules
CHC:	Gc (Crystallised) Grw (Reading/Writing)
CLOSER Source:	Not currently available in CLOSER Discovery
Administration method:	Writing and speaking; interviewer enters onto computer-assisted personal interview (CAPI)
Procedure:	All children within a defined age band received a fixed number of words. The child spells the word, then reads their answer to the interviewer, who enters correct or incorrect into CAPI. A stopping rule of 5 failures in a row was applied.
Link to questionnaire:	No link to the questionnaire, but user guide available: https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-2004-Guide-to-Child-Assessments.pdf
Scoring:	38 words in total, start and finish point based on age of child. Number of words varied by age: • age 6 years – 6 years 11 months = 15 words (1 - 15) • age 7 years – 8 years 11 months = 20 words (6 - 25) • age 9 years – 10 years 11 months = 20 words (11 - 30) • age 11 years – 16 years 11 months = 28 words (11 - 38)
Item-level variable(s):	• bassp01 – bassp15 (age 6 years – 6 years 11 months) • bassp06 – bassp25 (age 7 years – 8 years 11 months) • bassp11 – bassp30 (age 9 years – 10 years 11 months) • bassp11 – bassp38 (age 11 years – 16 years 11 months)

BCS70 CM child (multi-age; 2004): BAS II School Aged Exercises: Spelling	
Total score/derived variable(s):	• basspR (raw score) • bassp1hr (revised score - maximum of 100)
Age of participants (months):	Mean = 117.71, SD = 32.97, Range = 72 - 203
Descriptives:	basspR (raw score): N = 2,248 Range = 0 - 28 Mean = 13.34 SD = 5.56  bassp1hr (revised score - max. of 100): N = 2,248 Range = 0 - 100 Mean = 59.91 SD = 21.91 
Other sweep and/or cohort:	None
Source:	Modified version (reduced number of words from 75 to 38 by using the first 5 in 10 of 7 blocks and 3 of 5 of the last block of BAS) of: • Elliott, C. D., Smith, P., & McCulloch, K. (1996). British Ability Scales Second Edition (BAS II). Administration and Scoring Manual. London: Nelson. • Elliott, C. D., Smith, P., & McCulloch, K. (1997). British Ability Scales Second Edition (BAS II). Technical Manual. London: Nelson.
Technical resources:	• Parsons, S., Bynner, J., & Foudouli, V. (2005). Measuring basic skills for longitudinal study: the design and development of instruments for use with cohort members in the age 34 follow-up in the 1970 British Cohort Study. NRDC: London.

BCS70 CM child (multi-age; 2004): BAS II School Aged Exercises: Spelling	
	https://discovery.ucl.ac.uk/id/eprint/10004767/1/Bynner2005Measuring.pdf • Parsons, S. (2006). British Cohort Study 2004 Follow up: Guide to Child Assessment Data, CLS Working Paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70-2004-Guide-to-Child-Assessments.pdf
Example articles:	• Crawford, C., Goodman, A., & Joyce, R. (2011). Explaining the socio-economic gradient in child outcomes: the inter- generational transmission of cognitive skills. Longitudinal and Life Course Studies, 2(1), 77-93.

4.7 BCS70 Age 21 sub-sample survey (1992)

In 1992, when aged 21 years, a sub-sample (N = 1,623) of the BCS70 cohort were involved in a sweep focused on education, training and employment, and literacy and numeracy skills, which were topics deemed important to explore at this age.

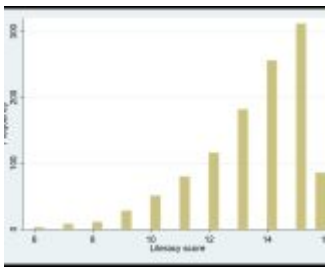
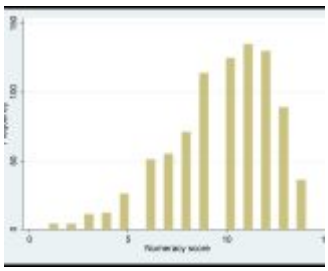
4.7.1 Literacy and numeracy assessments

BCS70 Age 21 sub-sample survey (1992): Literacy and Numeracy Assessments	
Domain:	Adult basic literacy and numeracy
Measures:	(Functional) literacy and numeracy assessment. The assessment covered four levels for communication skills and the three levels for numeracy as defined by Adult Literacy and Basic Skills Unit's (ALBSU) Basic Skills Standards. These emphasise 'functional' performance, i.e. the ability to apply basic skills in everyday life situations (ACACE, 1982).
CHC:	None
CLOSER Source:	Not currently available in CLOSER Discovery
Administration method:	Face to face interviewer; paper and showcards; pen and paper
Procedure:	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 open response (OR) in format. There were 25 literacy items and 16 numeracy items.

BCS70 Age 21 sub-sample survey (1992): Literacy and Numeracy Assessments	
	Duration: 28 minutes for both tests
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70_21-year_Survey-Questionnaire.pdf (from page 103)

Scoring:	Literacy (25 items):
	• One point for each correct answer
	• 16 items were used to derive a score that was comparable with NCDS
	• Scores were categorised as follows:
	  ○ 0 – 9 = 1 "very poor"
	  ○ 10 – 11 = 2 "poor",
	  ○ 12 – 13 = 3 "average"
	  ○ 14 – 16 = 4 "good"
	
	Numeracy (16 items):
	• One point for each correct answer
	• Scores were categorised as follows:
	  ○ 0 – 6 = 1 "very poor"
	  ○ 7 – 8 = 2 "poor"
	  ○ 9 – 10 = 3 "average"
	  ○ 11 – 14 = 4 "good"

Item-level variable(s):	Literacy (16 items): • vd1a – vd1b • vd2a1 – vd2b2 • vd3a1 – vd3b3 • vd4a1 – vd4a3 • v4dc2 • vd5 Literacy (additional 9 items): • vd4b1 – vd4b4 • 4dc1a – 4dc1e Numeracy (14 items): • vd6a1 vd6a2 vd6b1 vd6b2 vd6b3 vd6b4 vd7a1 vd7a2 vd7b1 vd7b2 vd8a1 vd8a2 vd8a3 vd8b1 vd8b2 vd8b3 vd8c1 vd8c2 vd8c3 vd9a vd9b
Total score/derived variable(s):	• litscore (sum of 16 items) • lit4grp (categorical) • numscore (sum of 14 items)

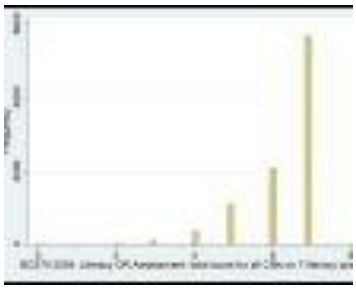
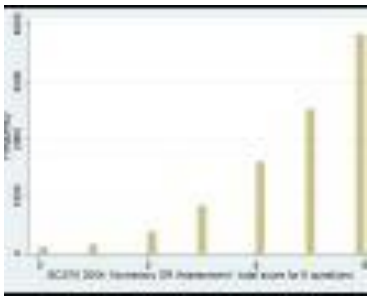
BCS70 Age 21 sub-sample survey (1992): Literacy and Numeracy Assessments	
	• num4grp (categorical)
Age of participants (months):	N/A
Descriptives:	litscore (raw score) N = 1,133 Range = 6 - 16 Mean = 13.42 SD = 1.91  numscore (raw score) N = 863 Range = 1 - 14 Mean = 9.81 SD = 2.62 
Other sweep and/or cohort:	• BCS70 (age 34) • NCDS (age 37)* *BCS70 devised to be comparable with NCDS
Source:	Assessments devised by consultants, Cambridge Training and Development Ltd designed to operationalise the ALBSU Basic Skills Standards for the BCS70.
Technical resources:	Ekinsmyth, C., & Bynner, J. (1994). The basic skills of young adults. London: Basic Skills Agency. https://eric.ed.gov/?id=ED371232
Example articles:	• Bynner, J., & Steedman, J. (1995). Difficulties with basic skills: Findings from the 1970 British Cohort Study. London: Basic Skills Agency. Available from

BCS70 Age 21 sub-sample survey (1992): Literacy and Numeracy Assessments	
	https://www.bibliography.cls.ucl.ac.uk/shared/get-file.ashx?id=611&itemtype=document

4.8 BCS70 Age 34 (2004)

4.8.1 Basic skills: literacy and numeracy assessments (open-response)

BCS70 Age 34 (2004): Basic skills: literacy and numeracy (open-response)	
Domain:	Adult basic literacy and numeracy
Measures:	(Functional) literacy and numeracy assessment.
CHC:	N/A
CLOSER Source:	Not currently available in CLOSER Discovery
Administration method:	Computer-assisted personal interview (CAPI) and paper
Procedure:	The interviewer showed the cohort member a visual stimulus on a specified show card, for example a map or a page from the Yellow Pages, and then asked a question. When the cohort member gave their answer, the interviewer coded it as "Correct" or "Incorrect" (including "Don't Know" responses). For two items that were considered challenging for interviewers to code, there was a third option "Interviewer cannot code" which allowed interviewers to record the cohort members verbatim response. Interviewers used this code if they were unsure whether the cohort member's response was correct or incorrect. These verbatim responses were coded by the CLS research team.
Link to questionnaire:	Not available: Examples in Parsons (2012) in "Technical Resources" below
Scoring:	13 items, 7 literacy and 6 numeracy; 1 point for correct answer
Item-level variable(s):	• litor01a litor01b litor02a litor02b litor03a litor03b litor03c • numor01a numor01b numor02a numor03a numor04a numor04b
Total score/derived variable(s):	• litort (sum of literacy) • numort (sum of numeracy)

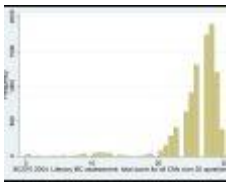
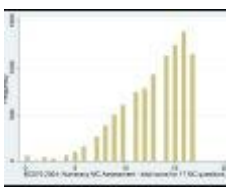
BCS70 Age 34 (2004): Basic skills: literacy and numeracy (open-response)	
Age of participants (months):	
Descriptives:	litort (raw score): N = 9,521 Range = 0 - 7 Mean = 6.31 SD = 1.06  numscore (raw score): N = 9,510 Range = 0 - 6 Mean = 4.80 SD = 1.37 
Other sweep and/or cohort:	• BCS70 (age 21) • NCDS (age 37) – BCS70 devised to be comparable with NCDS
Source:	Derived from BCS70 (age 21) survey
Technical resources:	• Parsons, S. (2012). User guide to accompany the 1970 British Cohort Study 2004 adult literacy and numeracy assessment data. CLS, working paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/FINAL-BCS70-user-guide-2004-Adult-Literacy-and-Numeracy.pdf For further details on the design of the new assessment and initial results see: • Parsons, S., Bynner, J., & Foudouli, V. (2005). Measuring basic skills

BCS70 Age 34 (2004): Basic skills: literacy and numeracy (open-response)	
	for longitudinal study: the design and development of instruments for use with cohort members in the age 34 follow- up in the 1970 British Cohort Study. NRDC: London. https://discovery.ucl.ac.uk/id/eprint/10004767/1/Bynner2005Measuring.pdf
Example articles:	• Bynner, J. & Parsons, S. (2005). New Light on Literacy and Numeracy. London: National Research and Development Centre for adult literacy and numeracy. • Schoon, I., Parsons, S., Rush, R., & Law, J. (2010). Childhood language skills and adult literacy: A 29-year follow-up study. Pediatrics, 125(3), e459-e466.

4.8.2 Literacy and numeracy skills (multiple choice)

BCS70 Age 34 (2004): Literacy and numeracy skills (multiple choice)	
Domain:	Basic adult literacy and numeracy skills
Measures:	The multiple-choice assessments measured adult literacy and numeracy based on items from the Skills for Life Survey (2003) using the National Standards of adult literacy and numeracy. The adult literacy core curriculum covers 'Speaking and Listening', 'Reading' and 'Writing'. This assessment covered Reading and Writing (and not speaking and listening). In the reading domain the questions measured: Reading Comprehension (RC), Grammar and Punctuation (GP) and Vocabulary, Word Recognition, Phonics (VWRP); while the writing domains were: Writing Composition (WC), Grammar and Punctuation (GP) and Spelling and Handwriting (SH). As with the Skills for Life Survey, item selection was heavily concentrated on the many aspects of 'Reading Comprehension'. The numeracy assessment covered seven aspects of number skill from the numeracy curriculum, using items in the original Skills for Life Survey. The items included: Basic Money (BM), Whole Numbers and Time (NT), Measures and Proportions (MP), Weights and Scales (WS), Length and Scaling (LS), Charts and Data (CD) and Money Calculations (MC).
CHC:	None

BCS70 Age 34 (2004): Literacy and numeracy skills (multiple choice)	
CLOSER Source:	Not currently available in CLOSER Discovery
Administration method:	CASI self-completion (Where the cohort member was unable or reluctant to use the laptop, the interviewer assisted, and if necessary, administered the self-completion as an interview).
Procedure:	The assessment consisted of 20 questions assessing literacy skills and 17 questions assessing numeracy skills. Each question consisted of a visual image and some text. The question always appeared at the top of the screen, the image at the centre, and the four (in most cases) possible answers appeared at the bottom of the screen. The cohort member read the question on the screen and entered their answer, and then the next item appeared automatically. For most interviews, the multiple-choice was completed as a CASI, but there was an option for the interviewer to enter the cohort member's responses if they were asked to do so. Literacy: The literacy assessment consisted of 'two tiers' (upper and lower tier). A total of 20 multiple-choice literacy questions were asked, the first 10 were screening questions (Entry Level 3) covering Reading Comprehension x 7, Spelling and Handwriting (SH) x 2 and Writing Composition (WC) x 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 (RC x 4; WC x 2; GP x 2; SH x 1; VWRP x 1). Respondents who answered between six and ten screening questions correctly proceeded to the upper tier and answered five Level 1 (RC x 3; GP x 1; SH x 1) and five Level 2 (RC x 2; GP x 2; WC x1) questions. Numeracy: 17 multiple-choice questions were administered in order of difficulty within each curriculum topic. The order was as follows: Whole Numbers and Time (NT) x 2, Measures and Proportions (MP) x 2, Weights and Scales (WS) x 3, Length and Scaling (LS) x 3, Charts and Data (CD) x1, Money Calculations (MC) x 4, Basic Money (BM) x2. The assessment started and finished on an 'Entry level 3 question' (Parsons, 2012).
Link to questionnaire:	Not available: Examples in Parsons (2012) in "Technical Resources" below
Scoring:	Literacy: Scored ranged from 0 to 20 for each of the two tiers, where any correct answer was given a 1, and any incorrect answer 0. However, to calculate an overall score including all participants, those who answered the lower tier i.e. less difficult section were assumed not to have been able to answer the higher tier questions and accordingly

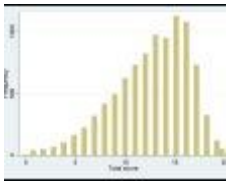
BCS70 Age 34 (2004): Literacy and numeracy skills (multiple choice)	
	scored 0, while those completing the higher tire received a score of 1. Numeracy: Scores ranged from 0 to 17; any correct answer was given a 1, any incorrect answer 0 (See bcs70_2004_user_guide.pdf pp. 25-38 for details on scoring).
Item-level variable(s):	N/A
Total score/derived variable(s):	Literacy: • litmc20 (raw score 0 - 17) • litmc30 (total raw score: lower tier 0 - 15 and upper tier 16 - 30) litall27, litall37 (total raw MC and OR score) • litlev, litlevg (banded by National Standards level) Numeracy: • nummct (raw score 0 - 17) • numall (total raw MC and OR score 0 - 23) • NUMLEV, numlevg (banded by National Standards level)
Age of participants (months):	N/A
Descriptives:	litmc30 (raw score): N = 9,568 Range = 0 - 30 Mean = 25.72 SD = 4.24  nummct (raw score): N = 9,562 Range = 0 - 17 Mean = 12.86 SD = 3.41 

BCS70 Age 34 (2004): Literacy and numeracy skills (multiple choice)	
Other sweep and/or cohort:	None
Source:	• Williams, J., Clemens, S., Oleinikova, K., & Tarvin, K. (2003). The Skills for Life survey: A national needs and impact survey of literacy, numeracy and ICT skills. DfES Research Report 490. Devised by the Centre for the Development and Evaluation of Lifelong Learning (CDELL) at the University of Nottingham. Carried out by BMRB on behalf of the Department for Education and Skills in 2002.
Technical resources:	• Parsons, S. (2012). User guide to accompany the 1970 British Cohort Study 2004 adult literacy and numeracy assessment data. CLS, working paper. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/FINAL-BCS70-user-guide-2004-Adult-Literacy-and-Numeracy.pdf • For further details see Parsons, S., Bynner, J., & Foudouli, V. (2005). Measuring basic skills for longitudinal study: the design and development of instruments for use with cohort members in the age 34 follow- up in the 1970 British Cohort Study. NRDC: London. https://discovery.ucl.ac.uk/id/eprint/10004767/1/Bynner2005Measuring.pdf
Example articles:	• de Coulon, A., Meschi, E., & Vignoles, A. (2011). Parents' skills and children's cognitive and non-cognitive outcomes. *Education economics*, *19*(5), 451-474. • Vignoles, A., De Coulon, A., & Marcenaro-Gutierrez, O. (2011). The value of basic skills in the British labour market. *Oxford Economic Papers*, *63*(1), 27-48.

4.9 BCS70 Age 42 (2012)

4.9.1 APU (Applied Psychological Unit) Vocabulary Test

BCS70 Age 42 (2012): APU Vocabulary Test	
Domain:	Verbal (vocabulary)
Measures:	Vocabulary Meaning of words Word knowledge

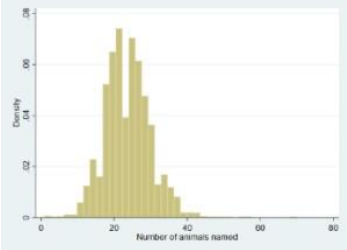
BCS70 Age 42 (2012): APU Vocabulary Test	
CHC:	Gc (Crystallised ability)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 42 Survey (2012).
Administration method:	Timed conditions; computer-assisted personal interview (CAPI) and paper
Procedure:	There were 20 words in the test. Each word was followed by a multiple-choice list of 5 words from which the respondent picked the word with the same meaning as the original word. The test got progressively harder. Duration: 4 minutes.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/BCS70_Mainstage_FULL_QUESTIONNAIRE_final.pdf
Scoring:	20 items; 1 point for each correct response, 0 for incorrect or not attempted
Item-level variable(s):	B9VQ1A – B9VSQ20
Total score/derived variable(s):	• B9VSCORE • B9VSCORB (banded variable)
Age of participants (months):	Mean = 509.35, SD = 2.76, Range = 500 - 517
Descriptives:	N = 9,433 Range = 0 - 20 Mean = 12.60 SD =3.71 
Other sweep and/or cohort:	• BCS70 (age 16) • MCS (age 14) – shortened version (20 items)
Source:	Shortened version (20 of original 75 items) of Closs, S. J. (1976). APU vocabulary test (multiple choice format, 1986). Kent: Hodder and Stoughton Educational Ltd.

BCS70 Age 42 (2012): APU Vocabulary Test	
Technical resources:	Levy P & Goldstein H. (1984). Tests in Education: a book of critical reviews. London: Academic Press.
Example articles:	• Sullivan, A. & Brown, M. (2015). Vocabulary from adolescence to middle age. *Longitudinal and Life Course Studies* 6(2):173-89. • Cheng, H., & Furnham, A. (2019). Correlates of Adult Vocabulary Task Performance: Findings from a British Cohort. *Journal of Intelligence*, 7(1), 2.

4.10 BCS70 Age 46-47 (2016)

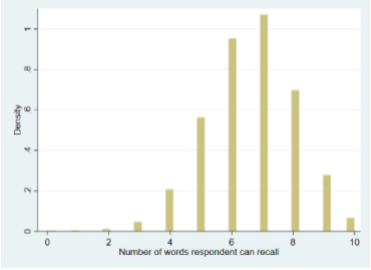
4.10.1 Verbal Fluency (Animal Naming) Test

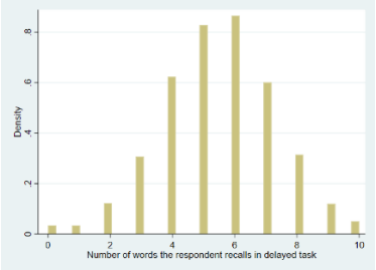
BCS70 Age 46-47 (2016): Verbal Fluency (Animal Naming) Test	
Domain:	Verbal fluency
Measures:	Verbal/semantic fluency Executive function
CHC:	Glr (Long-Term Storage and Retrieval)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 46 Survey (2017).
Administration method:	Trained interviewer; computer-assisted personal interview (CAPI)
Procedure:	Participants were asked to name as many different animals as possible within a one-minute timeframe. The interviewer made a note of each named animal and entered the total number into the CAPI programme. Repetitions, named animals (e.g. Bambi), and redundancies (e.g. white cat, black cat) were not included in the total score.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2018/10/BCS70_collated-CAPI-specs_FINAL.pdf
Scoring:	Total number of animals named
Item-level variable(s):	None
Total score/derived variable(s):	B10CFANI

BCS70 Age 46-47 (2016): Verbal Fluency (Animal Naming) Test	
Age of participants (months):	Mean = 563.26, SD = 8.26, Range = 542 - 578
Descriptives:	N = 8,498 Range = 1 - 70 Mean = 23.63 SD = 6.19 
Other sweep and/or cohort:	• NCDS (age 50, age 62) • NSHD (age 53)
Source:	Taken from Section B (cognitive assessment) of the Cambridge Mental Disorders of the Elderly Examination (CAMDEX) (Roth et al., 1986). Cognitive measures at this sweep were taken from the 2002 English Longitudinal Study of Ageing (ELSA; Taylor et al., 2007).
Technical resources:	Banks, J., Breeze, E., Lessof, C., & Nazroo, J. (2006). Retirement, health and relationships of the older population in England: The 2004 English Longitudinal Study of Ageing (Wave 2). https://discovery.ucl.ac.uk/id/eprint/15351/1/15351.pdf
Example articles:	Not available at time of writing.

4.10.2 Verbal Learning / Word List Recall Test (Immediate and Delayed)

BCS70 Age 46-47 (2016): Verbal Learning / Word List Recall Test (Immediate and Delayed)	
Domain:	Verbal (memory)
Measures:	Attention Short-term episodic memory Verbal memory
CHC:	Glr (Long-Term Storage and Retrieval)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 46 Survey (2017).

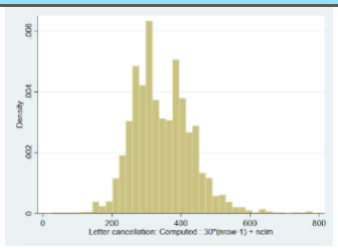
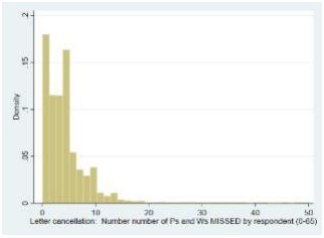
BCS70 Age 46-47 (2016): Verbal Learning / Word List Recall Test (Immediate and Delayed)	
Administration method:	Trained interviewer; computer-assisted personal interview (CAPI)
Procedure:	One of four lists of 10 common words were selected by the CAPI, and presented to participant via a recorded voice at a rate of one word every 2-seconds. In cases where the computer voice was not audible, the interviewer read the words, mimicking the pace and clarity of the recorded voice. After the list had been read out, the participants were given two minutes to recall as many of the words as possible (in no particular order). The total number recalled was entered into the CAPI. After additional tests were administered (animal naming and letter cancellation), the interviewer asked the participant to again recall as many words as possible from the original list (words not repeated by CAPI/interviewer). This delayed memory task was administered approximately five minutes after the initial recall task.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2018/10/BCS70_collated-CAPI-specs_FINAL.pdf
Scoring:	Immediate recall: 10 items (scores range 0 - 10) Delayed recall: 10 items (scores range 0 - 10)
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	• B10CFLISN • B10CFLISD
Age of participants (months):	Mean = 563.26, SD = 8.26, Range = 542 - 578
Descriptives:	Recall (immediate): N = 8,501 Range = 0 - 10 Mean = 6.61 SD = 1.43 

BCS70 Age 46-47 (2016): Verbal Learning / Word List Recall Test (Immediate and Delayed)	
	Recall (delayed): N = 8,494 Range = 0 - 10 Mean = 5.47 SD = 1.81 
Other sweep and/or cohort:	• NCDS (age 50, age 61 - 63) • NSHD (age 43, age 53, age 60 - 64, age 68 - 70)* * For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. A simple total score is available calculated as the sum of the words correctly recalled at each trial.
Source:	Similar tasks have been used to measure verbal learning for decades, e.g. Bush and Mosteller (1955). Cognitive measures at this sweep were taken from the 2002 English Longitudinal Study of Ageing (ELSA; Taylor et al., 2007).
Technical resources:	Banks, J., Breeze, E., Lessof, C., & Nazroo, J. (2006). Retirement, health and relationships of the older population in England: The 2004 English Longitudinal Study of Ageing (Wave 2). https://discovery.ucl.ac.uk/id/eprint/15351/1/15351.pdf
Example articles:	Not available at time of writing.

4.10.3 Timed Letter Search / Letter Cancellation Test

BCS70 Age 46-47 (2016): Timed Letter Search / Letter Cancellation Test	
Domain:	Processing speed
Measures:	Attention/concentration Mental speed Visual scanning

BCS70 Age 46-47 (2016): Timed Letter Search / Letter Cancellation Test	
CHC:	Gv (Visual Processing) Gs (Processing Speed)
CLOSER Source:	Explore this sweep in Discovery: BCS70 Age 46 Survey (2017).
Administration method:	Pen and paper.
Procedure:	Cohort members were given a page of random letters arranged in rows (N = 26) and columns (N = 30) and were asked to cross out as many "Ps" and "Ws" as possible within a one-minute timeframe. They were instructed to work across each row from left-to right as if they were reading a page and they were asked to perform the task as quickly and accurately as possible. Once the allotted time was over, the respondent was asked to underline the last letter that reached their eye (any letter, target or otherwise). The total number of letters searched was summed to provide a measure of speed of processing, whereas the total number of target letters missed reflects level of accuracy.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2018/10/BCS70_collated-CAPI-specs_FINAL.pdf
Scoring:	Speed of processing: summed total of letters scanned. Accuracy: summed total of target letters missed.
Item-level variable(s):	Not currently available.
Total score/derived variable(s):	• B10CFCOR • B10CFMIS • B10CFRC
Age of participants (months):	Mean = 563.26, SD = 8.26, Range = 542 - 578
Descriptives:	Processing speed (letter reached): N = 8,242 Range = 28 - 780 Mean = 346.45 SD = 84.78

BCS70 Age 46-47 (2016): Timed Letter Search / Letter Cancellation Test	
	 Processing accuracy (number of "Ws" and "Ps" missed): N = 8,242 Range = 0 – 50 Mean = 4.26 SD = 4.01 
Other sweep and/or cohort:	• NCDS (age 50, age 61 - 63) • NSHD (age 43*, age 53, age 60 - 64, age 68 - 70) * 3 trials.
Source:	The letter cancellation test was initially developed for the NSHD 1946 birth cohort study (Richards et al., 1999) and has also been used in the MRC Cognitive Function and Ageing Study (MRC CFA Study, 1998). All cognitive measures at this sweep were taken from the 2002 English Longitudinal Study of Ageing (ELSA; Taylor et al., 2007).
Technical resources:	Banks, J., Breeze, E., Lessof, C., & Nazroo, J. (2006). Retirement, health and relationships of the older population in England: The 2004 English Longitudinal Study of Ageing (Wave 2). https://discovery.ucl.ac.uk/id/eprint/15351/1/15351.pdf
Example articles:	Not available at time of writing.

4.11 BCS70 Age 51-53 (2021-2024)

The age 51-53 sweep for BCS70 was carried out between 2021 and 2024 and data will be made available for research in autumn 2024.

Information about the exact procedures, response rate, and descriptive statistics is not yet available for the cognitive measures include in this sweep, but a list of the administered tests is provided below.

Three of the cognitive measures carried out in the previous age 46 sweep were re-administered (i-iii) and one new test was added (iv):

i) Verbal fluency (animal naming) test
ii) Verbal learning / word list recall test (immediate and delayed)
iii) Timed letter search / letter cancellation test
iv) National Adult Reading Test (NART)

5. Avon Longitudinal Study of Parents and Children (ALSPAC)

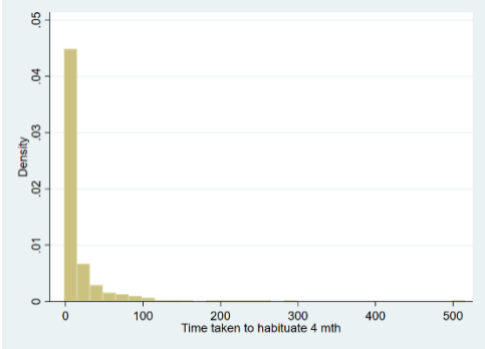
The cognitive measures included in ALSPAC between the ages of 4 months and 5 years were carried out as part of "Children in Focus" clinic visits. These clinics were attended by a sub-sample of 10% of the original ALSPAC cohort, who were picked at random from the last 6 months of ALSPAC births. Later cognitive assessments were carried out in the "Focus at …" clinics which were open to all of the ALSPAC cohort.

Additionally, the mothers of the original ALSPAC cohort children were invited to clinics ("Focus on Mothers") where cognitive assessments took place.

5.1 ALSPAC Children in Focus Clinic (age 4 months; 1992-1993)

5.1.1 Habituation Task

ALSPAC Children in Focus (age 4 months; 1992/93): Habituation Task	
Domain:	Non-verbal; Habituation
Measures:	Correlates with later general ability
CHC:	None
CLOSER source:	Explore this sweep in Discovery: ALSPAC Pregnancy, Birth and Infancy (pregnancy to 12 months)
Administration method:	Trained interviewer; clinical setting; physical task (eye-tracking)
Procedure:	Habituation refers to the extent to which attention directed towards a stimulus lessens over time. Research in this area works on the assumption that the amount of time an infant spends looking at a non-threatening stimulus before losing attention reflects speed of information processing. In other words, a child that 'habituates' to (i.e. loses interest in) a stimulus quickly is thought to be more efficient at processing information, compared with a child that takes a long time to lose interest in a stimulus. Habituation has been shown to correlate with later general ability (McCall & Carriger, 1993). During the task, the infant sat on the lap of the researcher, 18" away from a computer screen that projected a picture of four diamonds. The eye movements of the infants were tracked, and 'habituation' was reached when two successive 'bouts' of looking at the stimulus were shorter than the two previous 'bouts'. The infant was then presented with the same image alongside a new image, until s/he spent a total of 40 seconds

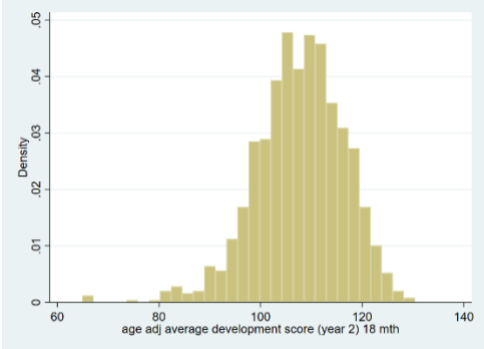
ALSPAC Children in Focus (age 4 months; 1992/93): Habituation Task	
	looking at both (novelty preference).
Link to questionnaire:	https://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Seconds taken to habituate (3.6 - 515.1)
Item-level variable(s):	cf700 - cf719 Explore these variables in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset
Total score/derived variable(s):	cf701
Descriptives:	Time taken to habituate: N = 1,432 Range = 3.6 - 515.1 Mean = 12.62 SD = 34.91 
Age of participants (weeks):	Mean = 16.61 weeks, SD = 0.79, Range = 15-21
Other sweep and/or cohort:	None
Source:	Designed specifically for ALSPAC by Dr Alan Slater, Department of Psychology, University of Exeter, UK, and by Dr Marc Bornstein, Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), USA.
Technical resources:	None
Example articles:	• Bornstein, M. H., Hahn, C. S., Bell, C., Haynes, O. M., Slater, A., Golding, J., ... & ALSPAC Study Team. (2006). Stability in cognition across early childhood: A developmental cascade. Psychological Science, 17(2), 151-158.

ALSPAC Children in Focus (age 4 months; 1992/93): Habituation Task	
	6. Bornstein, M. H., Hahn, C. S., & Wolke, D. (2013). Systems and cascades in cognitive development and academic achievement. Child development, 84(1), 154-162.

6.1 ALSPAC Children in Focus Clinic (age 18 months: 1993-1994)

6.1.1 Griffiths Scales of Mental Development

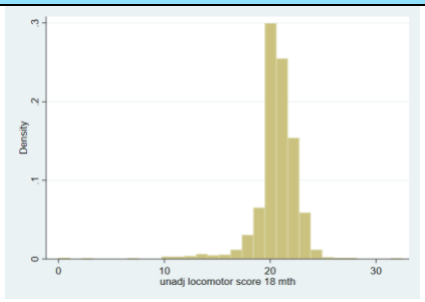
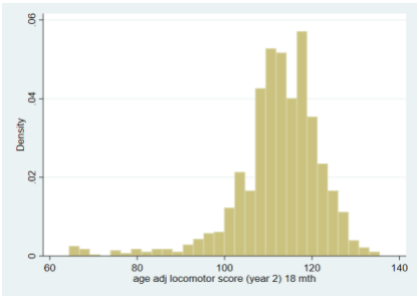
ALSPAC Children in Focus (age 18 months; 1993-1994): Griffiths Scales of Mental Development	
Domain:	Verbal and non-verbal ability
Measures:	Verbal ability Non-verbal/performance ability Psychomotor Abilities Personal/social skills
CHC:	G (General ability)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months)
Administration method:	Trained interviewer; clinical setting; guided play, physical task, oral questions, pen and paper.
Procedure:	The Griffiths Test consists of five subscales that assess the following areas of development: i) locomotion, ii) personal/social skills, iii) hearing and speech, iv) hand-eye coordination, and performance. The subscales consist of 86 items each. The first 48 items are designed for children aged 0 - 2 years, with the remaining 38 items belonging to the extension of the scale (6 additional items per year). Standardised developmental quotients (DQs) for each subscale are calculated using the formula: DQ = (Mental age x 100)/Chronological age. An overall DQ is calculated using the mean scores across all 5 scales. Due to time constraints, only the items pertaining to the age 12 to 24-month period were administered when children were aged 18 months. Thus, study children who were considerably advanced/delayed may have received inflated/deflated scores respectively. The scales were administered by eight trained testers. Each of the five sub-tests is detailed in a separate section below.

ALSPAC Children in Focus (age 18 months; 1993-1994): Griffiths Scales of Mental Development	
	Duration: approximately 45 minutes for each full sub-test
Link to questionnaire:	https://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised DQ (0 - 100).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf772 – cf783 (Explore these variables in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	Age adjusted average development score: N = 1,390 Range = 64.91 - 130.37 Mean = 88.02 SD = 42.81 
Age of participants (weeks):	Mean = 79.90 weeks, SD = 1.47, Range = 76 - 87
Other sweep and/or cohort:	None
Source:	Griffiths, R. (1970). The abilities of young children. *London: Child Development Research Centre*.
Technical resources:	None
Example articles:	• Hibbeln, J. R., Davis, J. M., Steer, C., Emmett, P., Rogers, I., Williams, C., & Golding, J. (2007). Maternal seafood consumption in pregnancy and neurodevelopmental outcomes in childhood (ALSPAC study): an observational cohort study. The Lancet, 369(9561), 578-585. • Pearson, R. M., Heron, J., Melotti, R., Joinson, C., Stein, A.,

ALSPAC Children in Focus (age 18 months; 1993-1994): Griffiths Scales of Mental Development	
	Ramchandani, P. G., & Evans, J. (2011). The association between observed non-verbal maternal responses at 12 months and later infant development at 18 months and IQ at 4 years: A longitudinal study. Infant Behavior and Development, 34(4), 525-533.

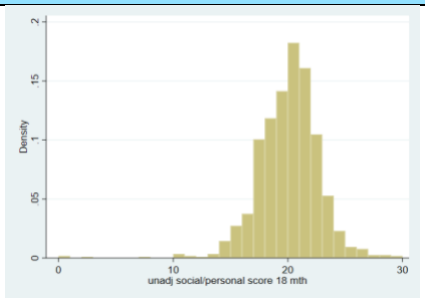
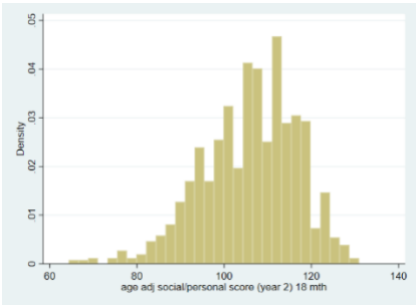
6.1.2 The Griffiths Locomotor Scale

ALSPAC Children in Focus (age 18 months; 1993-1994): Griffiths Locomotor Scale	
Domain:	Motor skills
Measures:	Psychomotor abilities Control precision Static strength
CHC:	Gp (Psychomotor Abilities)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; physical tasks
Procedure:	The interviewer noted (yes/no) whether the child was capable of performing physical tasks ranging in difficulty from 'Can climb on to a low ledge or step' to 'Can bring a chair to the table, place it in position and seat her/himself without help'.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised DQ (0 - 100).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	• cf772 • cf778 (Explore these variables in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	Unadjusted score: N = 1,174 Range = 0 - 32.5 Mean = 20.60 SD = 2.22

ALSPAC Children in Focus (age 18 months; 1993-1994): Griffiths Locomotor Scale	
	 Age adjusted score: N = 1,168 Range = 64.38 - 135.45 Mean = 112.21 SD = 10.06 
Age of participants (weeks):	Mean = 79.90 weeks, SD = 1.47, Range = 76 - 87
Other sweep and/or cohort:	None
Source:	Griffiths, R. (1970). The abilities of young children. *London: Child Development Research Centre*.
Technical resources:	None
Example articles:	• Little, R. E., Northstone, K., Golding, J., & ALSPAC Study Team. (2002). Alcohol, breastfeeding, and development at 18 months. Pediatrics, 109(5), e72-e72. • Hibbeln, J. R., Davis, J. M., Steer, C., Emmett, P., Rogers, I., Williams, C., & Golding, J. (2007). Maternal seafood consumption in pregnancy and neurodevelopmental outcomes in childhood (ALSPAC study): an observational cohort study. The Lancet, 369(9561), 578-585.

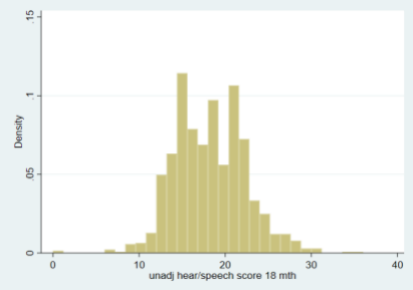
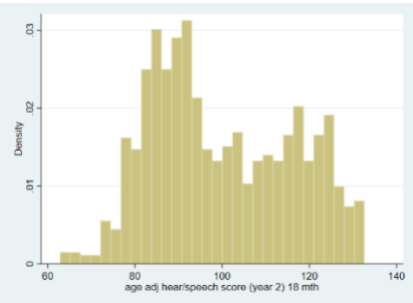
6.1.3 The Griffiths Personal-Social Scale

ALSPAC Children in Focus (age 18 months; 1993-1994): The Griffiths Personal-Social Scale	
Domain:	Verbal and non-verbal social skills
Measures:	Personal/social skills Genera verbal information Listening ability
CHC:	Gkn (General domain-specific knowledge) Gc (Crystallized Intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; guided play session
Procedure:	During a guided play session, the interviewer noted (yes/no) whether the child was capable of performing tasks ranging in difficulty from 'Puts small objects in and out of cup in play' to 'Begins to co-operate in play with other children'. Also included a number of acquired knowledge items, e.g. "Where are the dolly's hands, etc."
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised DQ (0 - 100).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	• cf773 • cf779 (Explore these variables in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	Unadjusted score: N = 1,174 Range = 0 - 30 Mean = 19.82 SD = 2.69

ALSPAC Children in Focus (age 18 months; 1993-1994): The Griffiths Personal-Social Scale	
	 Age adjusted score: N = 1,168 Range = 64.38 - 130.92 Mean = 106.00 SD = 10.87 
Age of participants (weeks):	Mean = 79.90 weeks, SD = 1.47, Range = 76-87
Other sweep and/or cohort:	None
Source:	Griffiths, R. (1970). The abilities of young children. *London: Child Development Research Centre*.
Technical resources:	None
Example articles:	• Little, R. E., Northstone, K., Golding, J., & ALSPAC Study Team. (2002). Alcohol, breastfeeding, and development at 18 months. Pediatrics, 109(5), e72-e72. • Pearson, R. M., Heron, J., Melotti, R., Joinson, C., Stein, A., Ramchandani, P. G., & Evans, J. (2011). The association between observed non-verbal maternal responses at 12 months and later infant development at 18 months and IQ at 4 years: A longitudinal study. Infant Behavior and Development, 34(4), 525-533.

6.1.4 The Griffiths Hearing and Speech Scale

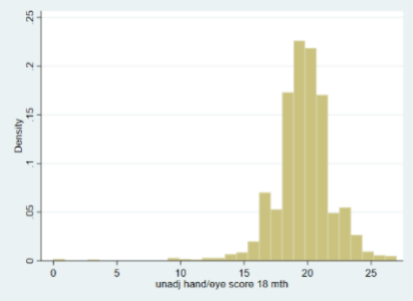
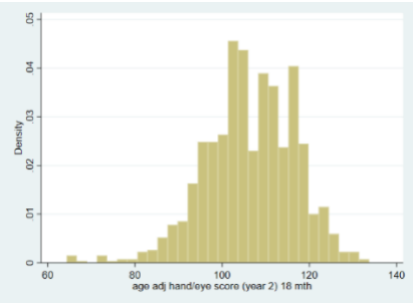
ALSPAC Children in Focus (age 18 months; 1993-1994): The Griffiths Hearing and Speech Scale	
Domain:	Hearing and speech ability
Measures:	General verbal information Language development Lexical knowledge Listening ability Communication ability Oral production and fluency
CHC:	Gc (Crystallized Intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; guided play session
Procedure:	During a guided play session, several tasks were administered by the interviewer, and the interviewer recorded whether the child could complete each task, e.g. whether the child could turn the pages of the picture book, whether they knew their own name, whether they used clear words, whether they could identify objects in a box of toys, whether they could name the contents of various pictures.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised DQ (0 - 100).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	• cf774 • cf780 (Explore these variables in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	Unadjusted score: N = 1,174 Range = 0 - 36 Mean = 18.20 SD = 4.13

ALSPAC Children in Focus (age 18 months; 1993-1994): The Griffiths Hearing and Speech Scale	
	 Age adjusted score: N = 1,168 Range = 62.82 - 132.62 Mean = 99.84 SD = 16.11 
Age of participants (weeks):	Mean = 79.90 weeks, SD = 1.47, Range = 76 - 87
Other sweep and/or cohort:	None
Source:	Griffiths, R. (1970). The abilities of young children. *London: Child Development Research Centre*.
Technical resources:	Griffiths, R. (1970). The abilities of young children. *London: Child Development Research Centre*.
Example articles:	• Hibbeln, J. R., Davis, J. M., Steer, C., Emmett, P., Rogers, I., Williams, C., & Golding, J. (2007). Maternal seafood consumption in pregnancy and neurodevelopmental outcomes in childhood (ALSPAC study): an observational cohort study. The Lancet, 369(9561), 578-585. • Pearson, R. M., Heron, J., Melotti, R., Joinson, C., Stein, A., Ramchandani, P. G., & Evans, J. (2011). The association between observed non-verbal maternal responses at 12 months and later infant development at 18 months and IQ at 4 years: A longitudinal study. Infant Behavior and

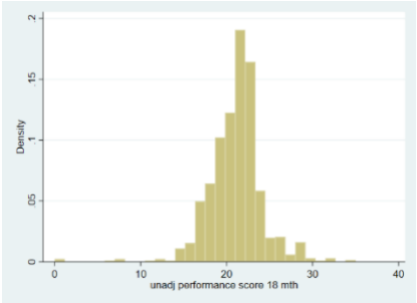
ALSPAC Children in Focus (age 18 months; 1993-1994): The Griffiths Hearing and Speech Scale
Development, 34(4), 525-533.

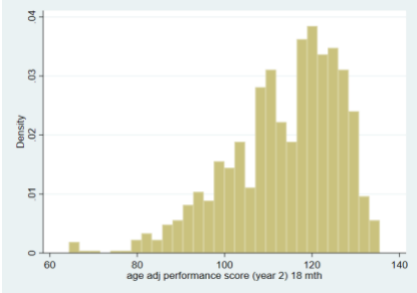
6.1.5 The Griffiths Hand and Eye Coordination Scale

ALSPAC Children in Focus (age 18 months; 1993-1994): The Griffiths Hand and Eye Coordination Scale	
Domain:	Coordination
Measures:	Hand and eye coordination Finger dexterity Manual dexterity Arm-hand steadiness Aiming
CHC:	Gp (Psychomotor Abilities)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; guided play session; pen and paper
Procedure:	During a guided play session, the researcher noted whether the child could complete a series of tasks, e.g. whether the child could use a pencil on paper a little, build a tower of 3-7 blocks, throw a ball.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised DQ (0 - 100).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	• cf775 • cf781 (Explore these variables in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	Unadjusted score: N = 1,174 Range = 0 - 27 Mean = 19.611 SD = 2.35

ALSPAC Children in Focus (age 18 months; 1993-1994): The Griffiths Hand and Eye Coordination Scale	
	 Age adjusted score: N = 1,167 Range = 64.38 - 133.71 Mean = 106.48 SD = 10.28 
Age of participants (weeks):	Mean = 79.90 weeks, SD = 1.47, Range = 76-87
Other sweep and/or cohort:	None
Source:	Griffiths, R. (1970). The abilities of young children. London*: Child Development Research Centre*.
Technical resources:	None
Example articles:	• Little, R. E., Northstone, K., Golding, J., & ALSPAC Study Team. (2002). Alcohol, breastfeeding, and development at 18 months. *Pediatrics*, *109*(5), e72-e72. • Pearson, R. M., Heron, J., Melotti, R., Joinson, C., Stein, A., Ramchandani, P. G., & Evans, J. (2011). The association between observed non-verbal maternal responses at 12 months and later infant development at 18 months and IQ at 4 years: A longitudinal study. *Infant Behavior and Development*, *34*(4), 525-533.

6.1.6 The Griffiths Performance Scale

ALSPAC Children in Focus (age 18 months; 1993-1994): The Griffiths Performance Scale	
Domain:	Non-verbal ability
Measures:	Length estimation
CHC:	Gv (Visual processing) Gp (Psychomotor abilities)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months)
Administration method:	Trained interviewer; clinical setting; guided play session
Procedure:	During a guided play session, the researcher presented the child with a series of boards and objects (insets) that could fit into shapes that were cut out of the boards. The researcher demonstrated how the insets fitted into the board, and the child was given the opportunity to copy. This was done with increased difficulty (increased number of holes and shapes in boards).
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised DQ (0 - 100).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	• cf776 • cf782 (Explore these variables in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	Unadjusted score: N = 1,174 Range = 0 - 35 Mean = 21.14 SD = 3.10  Age adjusted score:

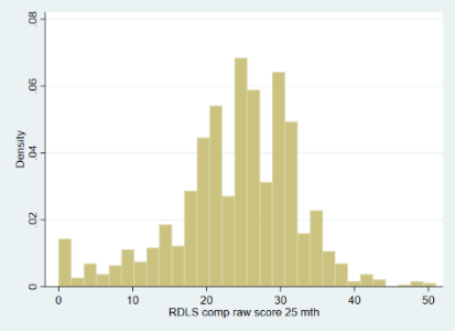
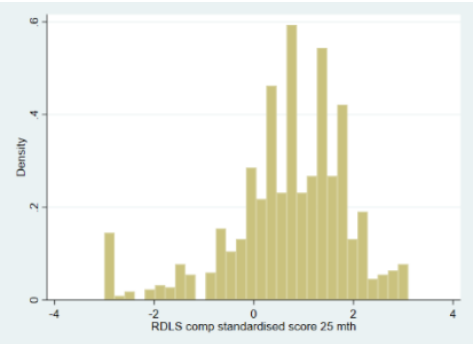
ALSPAC Children in Focus (age 18 months; 1993-1994): The Griffiths Performance Scale	
	N = 1,142 Range = 64.38 - 135.45 Mean = 113.83 SD = 12.68 
Age of participants (weeks):	Mean = 79.90 weeks, SD = 1.47, Range = 76-87
Other sweep and/or cohort:	None
Source:	Griffiths, R. (1970). The abilities of young children. London*: Child Development Research Centre*.
Technical resources:	Griffiths, R. (1970). The abilities of young children. London*: Child Development Research Centre*.
Example articles:	• Little, R. E., Northstone, K., Golding, J., & ALSPAC Study Team. (2002). Alcohol, breastfeeding, and development at 18 months. *Pediatrics*, *109*(5), e72-e72. • Hibbeln, J. R., Davis, J. M., Steer, C., Emmett, P., Rogers, I., Williams, C., & Golding, J. (2007). Maternal seafood consumption in pregnancy and neurodevelopmental outcomes in childhood (ALSPAC study): an observational cohort study. *The Lancet*, *369*(9561), 578-585.

6.2 ALSPAC Children in Focus Clinic (age 25 months; 1994-1995)

6.2.1 The Reynell Developmental Language Scale (Verbal Comprehension Subscale)

ALSPAC Children in Focus (age 25 months; 1994-1995): The Reynell Developmental Language Scale (Verbal Comprehension Subscale)	
Domain:	Language ability

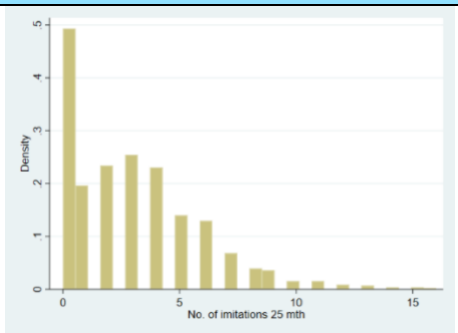
ALSPAC Children in Focus (age 25 months; 1994-1995): The Reynell Developmental Language Scale (Verbal Comprehension Subscale)	
Measures:	Language development Verbal/lexical comprehension Listening ability
CHC:	Gc (Crystallized Intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; guided play session
Procedure:	During a guided play session, the child was presented with a set of toys and asked to carry out a series of tasks of increasing complexity. First, the child was asked to select a specific toy (e.g. "Where is the horse?"). Next the child was asked to manipulate the toy in increasingly complex ways in order to demonstrate understanding, e.g. "Put the spoon in the cup", "Put the white button underneath the cup".
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Raw (0 – 55) and standardised (-11 – 3) scores are available, with the standardised score reflecting how well the children performed in comparison with other children at age 2 years (mean = 0, SD = +/- 1).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf421 – cf424 (Explore these variables in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	Raw score: N = 1,109 Range = 0 - 51 Mean = 23.90 SD = 8.44

ALSPAC Children in Focus (age 25 months; 1994-1995): The Reynell Developmental Language Scale (Verbal Comprehension Subscale)	
	 Standardised score: N = 1,085 Range = -3 - 3.1 Mean = 0.69 SD = 1.17 
Age of participants (weeks):	Mean = 108.24 weeks, SD =0.98, Range = 106 - 115
Other sweep and/or cohort:	• ALSPAC (Age 5 years/61 months)
Source:	Reynell, J., & Curwen, M. P. (1977). *Manual for the Reynell developmental language scales (revised)*. NFER.
Technical resources:	Reynell, J. K., & Gruber, C. P. (1997). *Reynell developmental language scales*. Western Psychological Services.
Example articles:	• Roulstone, S., Loader, S., Northstone, K., & Beveridge, M. (2002). The speech and language of children aged 25 months: Descriptive data from the Avon Longitudinal Study of Parents and Children. *Early Child Development and Care*, *172*(3), 259-268. • Clegg, J., Law, J., Rush, R., Peters, T. J., & Roulstone, S. (2015). The contribution of early language development to children's emotional and behavioural functioning at 6 years:

ALSPAC Children in Focus (age 25 months; 1994-1995): The Reynell Developmental Language Scale (Verbal Comprehension Subscale)	
	an analysis of data from the Children in Focus sample from the ALSPAC birth cohort. *Journal of Child Psychology and Psychiatry*, *56*(1), 67-75.

6.2.2 Object Naming Assessment

ALSPAC Children in Focus (age 25 months; 1994-1995): Object Naming Assessment	
Domain:	Verbal knowledge (expressive and spoken)
Measures:	Speech and sound production Oral production and fluency General verbal information
CHC:	Gc (Crystallised Intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; guided play session
Procedure:	The tester chose an object from a box and asked the child to name it. If the child was reluctant, they were encouraged to choose an object themselves and name it. If a child failed to name an object after 3 requests, the tester named it clearly for the child, and encouraged imitation. The number of errors made by the child in each sound class was recorded and the percentage error calculated from those words attempted.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Number of imitations (0 - 16).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf428 – cf435 (Explore these variables in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	Number of imitations: N = 1,099 Range = 0 - 16 Mean = 2.97 SD = 2.83

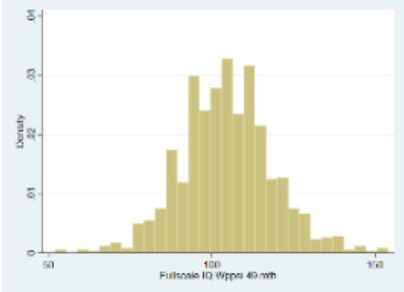
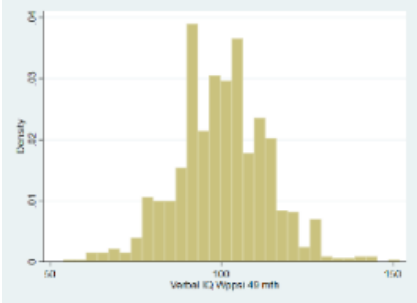
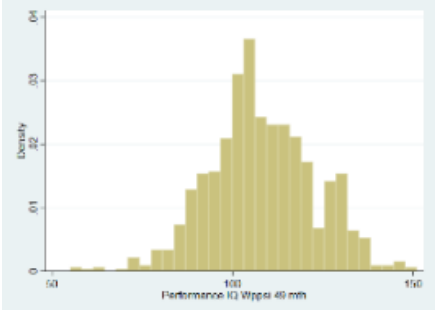
ALSPAC Children in Focus (age 25 months; 1994-1995): Object Naming Assessment	
	
Age of participants (weeks):	Mean = 108.24 weeks, SD =0.98, Range = 106 - 115
Other sweep and/or cohort:	• MCS (age 3 and 5) – similar object naming task involving pictures • BCS70 (children of cohort member, multi-age) – similar object naming task involving pictures
Source:	Adapted from a similar procedure devised by Paden, Novak & Beiter (1987)
Technical resources:	None
Example articles:	• Roulstone, S., Loader, S., Northstone, K., & Beveridge, M. (2002). The speech and language of children aged 25 months: Descriptive data from the Avon Longitudinal Study of Parents and Children. Early Child Development and Care, 172(3), 259- 268.

6.3 ALSPAC Children in Focus Clinic (age 49 months; 1996-1997)

6.3.1 Wechsler Pre-School and Primary Scale of Intelligence – Revised (WPPSI – R)

ALSPAC Children in Focus (age 49 months; 1996-1997): Wechsler Pre-school and Primary Scale of Intelligence – Revised (WPPSI-R)	
Domain:	Verbal and non-verbal ability
Measures:	Verbal ability Non-verbal/performance ability
CHC:	G (general ability)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).

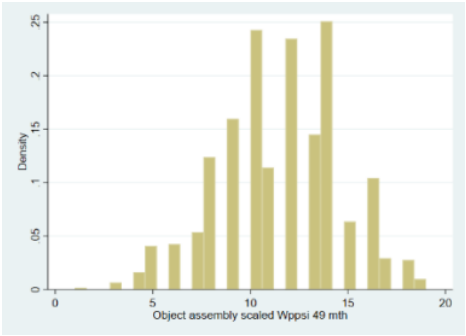
ALSPAC Children in Focus (age 49 months; 1996-1997): Wechsler Pre-school and Primary Scale of Intelligence – Revised (WPPSI-R)	
Administration method:	Trained interviewer; clinical setting
Procedure:	The WPPSI-R is a measure of cognitive functioning designed for children aged 3-7 years. It is comprised of two scales, verbal and performance (non-verbal), and each of these scales contains 5 subtests. The verbal subtests are: i) vocabulary, ii) similarities, iii) arithmetic, iv) information, v) comprehension. The performance subtests are: i) object assembly, ii) geometric design, iii) block design, iv) mazes, v) picture completion. Each subtest is described individually in the sections below. The WPPSI-R provides standard scores (M = 100, SD = 15), on verbal IQ, performance IQ and fullscale IQ. Scores on the individual subtests are standardised (M = 10, SD = 3). If fewer than 3 subtests were completed by the child, verbal, performance and fullscale IQ were not computed for that child. If 4 out of 5 subscales were completed on the verbal/performance scales, the mean of the 4 scales was substituted in for the missing 5th. This prorating strategy is a standard practice when using WPPSI-R. Raw scores are converted into scale scores using tables provided in the WPPSI-R manual.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised score (M = 100, SD = 15).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf801 – cf813 (Explore these variables in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)

ALSPAC Children in Focus (age 49 months; 1996-1997): Wechsler Pre-school and Primary Scale of Intelligence – Revised (WPPSI-R)	
Descriptives:	Fullscale IQ: N = 1013 Range = 52 - 154 Mean = 104.36 SD = 14.17  Verbal IQ: N = 1,013 Range = 54 - 152 Mean = 100.13 SD = 13.57  Performance IQ: N = 1,016 Range = 55 - 151 Mean = 107.98 SD = 14.56 
Age of participants	Mean = 212.39 weeks, SD = 1.63, Range = 207 - 221

ALSPAC Children in Focus (age 49 months; 1996-1997): Wechsler Pre-school and Primary Scale of Intelligence – Revised (WPPSI-R)	
(weeks):	
Other sweep and/or cohort:	None
Source:	Wechsler, D. (1989). *Wechsler Preschool and Primary Scale of Intelligence-Revised. WPPSI-R*. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). *Essentials of WISC-III and WPPSI-R Assessment*. John Wiley & Sons Inc.
Example articles:	• Gathercole, S. E., Briscoe, J., Thorn, A., Tiffany, C., & ALSPAC Study Team. (2008). Deficits in verbal long-term memory and learning in children with poor phonological short-term memory skills. *The Quarterly Journal of Experimental Psychology*, *61*(3), 474-490. • Taylor, C. M., Kordas, K., Golding, J., & Emond, A. M. (2017). Data relating to prenatal lead exposure and child IQ at 4 and 8 years old in the Avon Longitudinal Study of Parents and Children. *Neurotoxicology*, *62*, 224-230.

6.3.2 WPPSI – R: Object Assembly

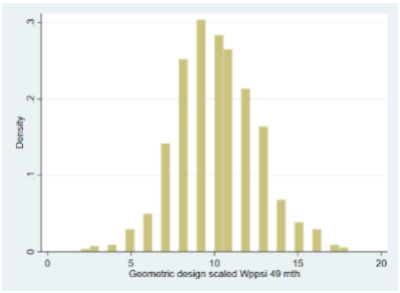
ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Object Assembly	
Domain:	Non-verbal reasoning
Measures:	Spatial visualization Non-verbal reasoning Simultaneous processing visual-motor coordination Dexterity Non-verbal concept formation
CHC:	Gf (Fluid intelligence) Gs (Processing speed)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; physical task
Procedure:	The child was presented with the pieces of a puzzle in a standard arrangement and was asked to fit the pieces together to form a meaningful whole within 90 seconds. A total of six trials were

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Object Assembly	
	administered. The child was assisted if they did not correctly complete the first puzzle (not scored). For the first two puzzles, the interviewer could prompt the child with phrase "now hurry", as young children often struggle to grasp the concept of being timed. Points were awarded for the correct number of junctures (where two pieces join), with bonus points added for correctly completed trials. Raw scores were converted into scale scores using tables provided in the WPPSI-R manual.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised score (M = 10, SD = 3).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf801 (Explore this variable in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	N = 1,023 Range = 1 - 19 Mean = 11.42 SD = 3.11 
Age of participants (weeks):	Mean = 212.39 weeks, SD = 1.63, Range = 207-221
Other sweep and/or cohort:	• ALSPAC (age 8.5)
Source:	Wechsler, D. (1989). *Wechsler Preschool and Primary Scale of Intelligence-Revised. WPPSI-R.* Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). *Essentials of WISC-III and WPPSI-R Assessment*. John Wiley & Sons Inc.
Example	• Gathercole, S. E., Briscoe, J., Thorn, A., Tiffany, C., & ALSPAC

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Object Assembly	
articles:	Study Team. (2008). Deficits in verbal long-term memory and learning in children with poor phonological short-term memory skills. The Quarterly Journal of Experimental Psychology, 61(3), 474-490. • Taylor, C. M., Kordas, K., Golding, J., & Emond, A. M. (2017). Data relating to prenatal lead exposure and child IQ at 4 and 8 years old in the Avon Longitudinal Study of Parents and Children. Neurotoxicology, 62, 224-230.

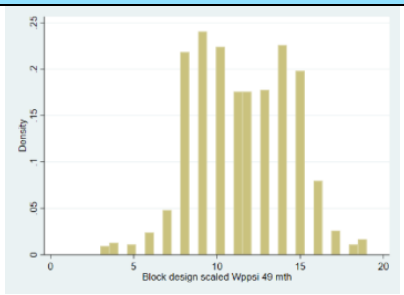
6.3.3 WPPSI – R: Geometric Design

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Geometric Design	
Domain:	Non-verbal ability
Measures:	Visual recognition Spatial visualisation Visual organisation Visual-motor coordination Fine-motor ability/finger dexterity Simultaneous processing
CHC:	Gv (Visual Processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	The child was presented with a stimulus booklet, and pen and paper. The subtest contains two sections: i) first, they were asked to match a pictured design from an array of four designs (items 1-8 in picture booklet) and ii) they were required to copy a geometric figure from a printed model (items 9-16 in picture booklet). Encouragement (e.g. "do your best"), but no assistance, was provided. There was no fixed time limit for this subtest. The first 8 items were scored at one point each, the last eight items were worth 4 points for a total raw score of 57 points.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised score (M = 10, SD = 3).

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Geometric Design	
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf802 (Explore this variable in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	N = 1,018 Range = 2 - 18 Mean = 10.11 SD = 2.48 
Age of participants (weeks):	Mean = 212.39 weeks, SD = 1.63, Range = 207-221
Other sweep and/or cohort:	None
Source:	Wechsler, D. (1989). *Wechsler Preschool and Primary Scale of Intelligence-Revised. WPPSI-R*. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). *Essentials of WISC-III and WPPSI-R Assessment*. John Wiley & Sons Inc.
Example articles:	• Gathercole, S. E., Briscoe, J., Thorn, A., Tiffany, C., & ALSPAC Study Team. (2008). Deficits in verbal long-term memory and learning in children with poor phonological short-term memory skills. *The Quarterly Journal of Experimental Psychology*, *61*(3), 474-490. • Taylor, C. M., Kordas, K., Golding, J., & Emond, A. M. (2017). Data relating to prenatal lead exposure and child IQ at 4 and 8 years old in the Avon Longitudinal Study of Parents and Children. *Neurotoxicology*, *62*, 224-230.

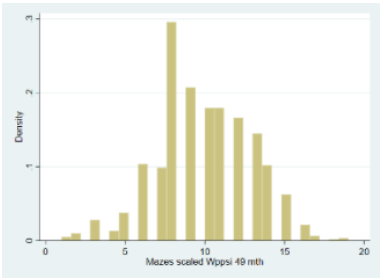
6.3.4 WPPSI – R: Block Design

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Block Design	
Domain:	Non-verbal ability
Measures:	Planning Spatial visualisation Visual motor coordination Simultaneous processing Synthesis (part-whole relationships) Non-verbal concept formation
CHC:	Gf (Fluid intelligence) Gs (Processing speed) Gv (Visual processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; physical task
Procedure:	The child was presented with an image or model that depicted a pattern and was tasked with recreating the pattern with one- and two-colour blocks (white and red). The test contained 14 designs, and the child was allowed two attempts at each design. Points were awarded for completion, and bonus points were awarded based on time
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised score (M= 10, SD =3).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf803 (Explore this variable in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	N = 1,013 Range = 3 - 19 Mean = 11.45 SD = 2.95

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Block Design	
	
Age of participants (weeks):	Mean = 212.39 weeks, SD = 1.63, Range = 207 - 221
Other sweep and/or cohort:	• ALSPAC (age 8.5) • MCS (age 5) – BAS pattern construction • MCS (age 7) – BAS pattern construction
Source:	Wechsler, D. (1989). *Wechsler Preschool and Primary Scale of Intelligence-Revised. WPPSI-R*. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). *Essentials of WISC-III and WPPSI-R Assessment*. John Wiley & Sons Inc.
Example articles:	• Bornstein, M. H., Hahn, C. S., Bell, C., Haynes, O. M., Slater, A., Golding, J., ... & ALSPAC Study Team. (2006). Stability in cognition across early childhood: A developmental cascade. *Psychological Science*, *17*(2), 151-158. • Taylor, C. M., Kordas, K., Golding, J., & Emond, A. M. (2017). Data relating to prenatal lead exposure and child IQ at 4 and 8 years old in the Avon Longitudinal Study of Parents and Children. *Neurotoxicology*, *62*, 224-230.

6.3.5 WPPSI – R: Mazes

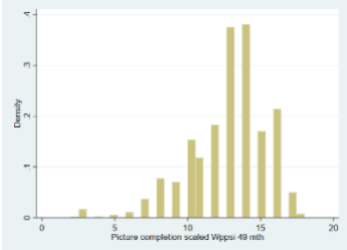
ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Mazes	
Domain:	Non-verbal ability
Measures:	Planning Simultaneous processing Spatial visualisation Visual-motor coordination Spatial scanning
CHC:	Gv (Visual processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Mazes	
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	The child was presented with a series of mazes and instructed to draw a pathway to the centre of each maze. For the first two mazes, the interviewer demonstrated by drawing half of the line. When necessary, the interviewer made use of several prompts to encourage the child to complete the mazes.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised score (M= 10, SD =3).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf804 (Explore this variable in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	N = 1,013 Range = 1 - 19 Mean = 9.87 SD = 2.95 
Age of participants (weeks):	Mean = 212.39 weeks, SD = 1.63, Range = 207 - 221
Other sweep and/or cohort:	None
Source:	Wechsler, D. (1989). *Wechsler Preschool and Primary Scale of Intelligence-Revised. WPPSI-R.* Psychological Corporation.
Technical resources:	• Kaufman, A. S., & Lichtenberger, E. O. (2000). *Essentials of WISC-III and WPPSI-R Assessment.* John Wiley & Sons Inc.
Example articles:	• Bornstein, M. H., Hahn, C. S., Bell, C., Haynes, O. M., Slater, A., Golding, J., ... & ALSPAC Study Team. (2006). Stability in cognition across early childhood: A developmental cascade.

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Mazes	
	Psychological Science, 17(2), 151-158. • Taylor, C. M., Kordas, K., Golding, J., & Emond, A. M. (2017). Data relating to prenatal lead exposure and child IQ at 4 and 8 years old in the Avon Longitudinal Study of Parents and Children. Neurotoxicology, 62, 224-230.

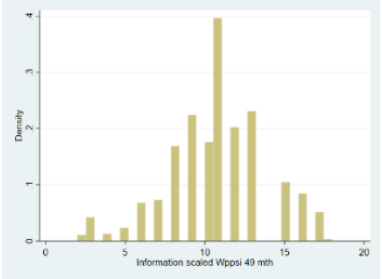
6.3.6 WPPSI – R: Picture Completion

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Picture Completion	
Domain:	Non-verbal visualisation
Measures:	Simultaneous processing Visual organisation Visual recognition
CHC:	Gv (Visual processing) Gc (Crystallised intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; child points to answer
Procedure:	The child was shown an image and then asked to point to or name the important missing part. For instance, a picture may have shown a person without an arm. Or, it might have shown a basketball game, complete with all the players, but with no ball. The child had 30 seconds to answer each item. Sample items (number differs with age) were provided to ensure the child understood the test. One point was awarded for each correct response within the time-limit.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised score (M= 10, SD =3).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf805 (Explore this variable in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	N = 1,014

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Picture Completion	
	Range = 2 – 18 Mean = 12.73 SD = 2.65 
Age of participants (weeks):	Mean = 212.39 weeks, SD = 1.63, Range = 207 - 221
Other sweep and/or cohort:	• ALSPAC age 8.5
Source:	Wechsler, D. (1989). *Wechsler Preschool and Primary Scale of Intelligence-Revised. WPPSI-R.* Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). *Essentials of WISC-III and WPPSI-R Assessment.* John Wiley & Sons Inc.
Example articles:	• Bornstein, M. H., Hahn, C. S., Bell, C., Haynes, O. M., Slater, A., Golding, J., ... & ALSPAC Study Team. (2006). Stability in cognition across early childhood: A developmental cascade. *Psychological Science*, *17*(2), 151-158. • Taylor, C. M., Kordas, K., Golding, J., & Emond, A. M. (2017). Data relating to prenatal lead exposure and child IQ at 4 and 8 years old in the Avon Longitudinal Study of Parents and Children. *Neurotoxicology*, *62*, 224-230.

6.3.7 WPPSI – R: Information

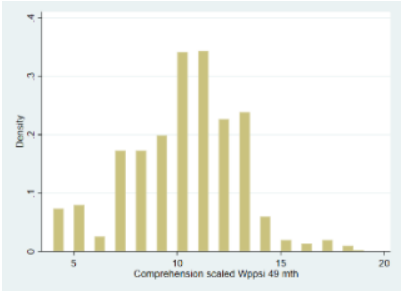
ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Information	
Domain:	Verbal ability
Measures:	General verbal information Verbal comprehension Listening ability Auditory/visual perception

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Information	
	Oral production and fluency
CHC:	Gc (Crystallised intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; child points to answer, answers orally
Procedure:	This test consisted of two parts. For the first part of the test, the child was presented with 6 sets of four images. For each set of images, the child was asked to point to a particular image (e.g. "can you point to the duck"). If the child did not point to the correct picture for the first item, the interviewer demonstrated. The second part of the test consisted of verbal items, in which the child was asked general knowledge questions, e.g. "show me your foot."
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised score (M= 10, SD =3)
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf806 (Explore this variable in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	N = 1,021 Range = 2 - 18 Mean = 10.68 SD = 3.03 
Age of participants (weeks):	Mean = 212.39 weeks, SD = 1.63, Range = 207 - 221
Other sweep and/or cohort:	• ALSPAC age 8.5

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Information	
Source:	Wechsler, D. (1989). *Wechsler Preschool and Primary Scale of Intelligence-Revised. WPPSI-R.* Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). *Essentials of WISC-III and WPPSI-R Assessment.* John Wiley & Sons Inc.
Example articles:	• Gathercole, S. E., Briscoe, J., Thorn, A., Tiffany, C., & ALSPAC Study Team. (2008). Deficits in verbal long-term memory and learning in children with poor phonological short-term memory skills. *The Quarterly Journal of Experimental Psychology*, *61*(3), 474-490. • Taylor, C. M., Kordas, K., Golding, J., & Emond, A. M. (2017). Data relating to prenatal lead exposure and child IQ at 4 and 8 years old in the Avon Longitudinal Study of Parents and Children. *Neurotoxicology*, *62*, 224-230.

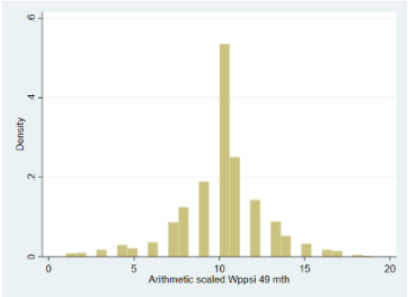
6.3.8 WPPSI – R: Comprehension

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Comprehension	
Domain:	Verbal comprehension
Measures:	Verbal comprehension Verbal reasoning Verbal expression
CHC:	Gc (Crystallised intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; responds orally
Procedure:	The child was asked a series of questions based on his or her understanding of general concepts, e.g. “Why do people brush their teeth?”, “Why can birds fly, but cats can’t?”. Interviewers could repeat questions if the child did not understand. Responses were scored on a 0 - 2 metric based on the content of their response. If the child spontaneously improved their answer, this was accepted.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised score (M= 10, SD =3).
Item-level	Not readily available.

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Comprehension	
variable(s):	
Total score/derived variable(s):	cf807 (Explore this variable in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	N = 1,006 Range = 4 - 19 Mean = 10.08 SD = 2.70 
Age of participants (weeks):	Mean = 212.39 weeks, SD = 1.63, Range = 207-221
Other sweep and/or cohort:	• ALSPAC age 8.5
Source:	Wechsler, D. (1989). *Wechsler Preschool and Primary Scale of Intelligence-Revised. WPPSI-R. Psychological Corporation*.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). *Essentials of WISC-III and WPPSI-R Assessment*. John Wiley & Sons Inc.
Example articles:	• Gathercole, S. E., Briscoe, J., Thorn, A., Tiffany, C., & ALSPAC Study Team. (2008). Deficits in verbal long-term memory and learning in children with poor phonological short-term memory skills. *The Quarterly Journal of Experimental Psychology*, *61*(3), 474-490. • Taylor, C. M., Kordas, K., Golding, J., & Emond, A. M. (2017). Data relating to prenatal lead exposure and child IQ at 4 and 8 years old in the Avon Longitudinal Study of Parents and Children. *Neurotoxicology*, *62*, 224-230.

6.3.9 WPPSI – R: Arithmetic

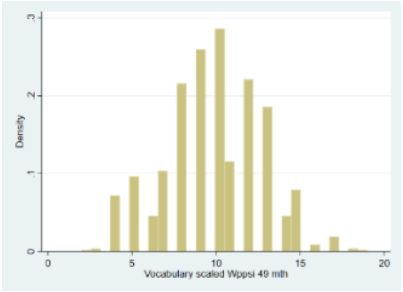
ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Arithmetic	
Domain:	Arithmetic ability

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Arithmetic	
Measures:	Numeric reasoning Sequential processing
CHC:	Gq (Quantitative Knowledge)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; pointing; questions and answers delivered orally
Procedure:	The test contained 23 items. For items 1-7, the child was asked to point to an object that illustrated a particular quantitative characteristic on a visually presented array of objects. For items 8- 11 the child demonstrated numeric knowledge by counting and manipulating blocks. For items 12-23, the child solved arithmetic problems that were read aloud by the interviewer. There was a time-limit for each of questions 12-23. If the child held up the correct number of fingers to indicate a numeric response, this was accepted.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised score (M= 10, SD =3).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf808 (Explore this variable in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	N = 1,015 Range = 1 - 19 Mean = 10.02 SD = 2.56 
Age of participants (weeks):	Mean = 212.39 weeks, SD = 1.63, Range = 207-221

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Arithmetic	
Other sweep and/or cohort:	None
Source:	Wechsler, D. (1989). *Wechsler Preschool and Primary Scale of Intelligence-Revised. WPPSI-R*. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). *Essentials of WISC-III and WPPSI-R Assessment.* John Wiley & Sons Inc.
Example articles:	• Gathercole, S. E., Briscoe, J., Thorn, A., Tiffany, C., & ALSPAC Study Team. (2008). Deficits in verbal long-term memory and learning in children with poor phonological short-term memory skills. *The Quarterly Journal of Experimental Psychology*, *61*(3), 474-490. • Taylor, C. M., Kordas, K., Golding, J., & Emond, A. M. (2017). Data relating to prenatal lead exposure and child IQ at 4 and 8 years old in the Avon Longitudinal Study of Parents and Children. *Neurotoxicology*, *62*, 224-230.

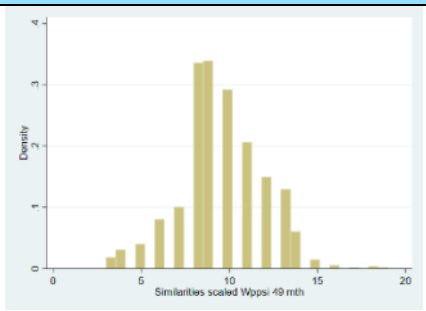
6.3.10 WPPSI – R: Vocabulary

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Vocabulary	
Domain:	Verbal ability
Measures:	Verbal comprehension Lexical knowledge Long-term memory Language development
CHC:	Gc (Crystallised intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months)
Administration method:	Trained interviewer; clinical setting; pen and paper, oral response
Procedure:	The test contained both picture and verbal sections. The first three items consisted of arrays of pictures, and the child was asked to point to a particular image. If the child provided an incorrect answer on the first question, the interviewer pointed out the correct answer. The remaining items (4-25) consisted of words that the interviewer read aloud and asked the child to define. Items 1-3 were worth 1 point each, whereas items 4-25 are worth scored on a 0 - 2 point scale.

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Vocabulary	
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised score (M= 10, SD =3).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf809 (Explore this variable in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	N = 1,006 Range = 2 - 19 Mean = 9.87 SD = 2.92 
Age of participants (weeks):	Mean = 212.39 weeks, SD = 1.63, Range = 207-221
Other sweep and/or cohort:	• ALSPAC Age 15
Source:	Wechsler, D. (1989). *Wechsler Preschool and Primary Scale of Intelligence-Revised.* WPPSI-R. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). *Essentials of WISC-III and WPPSI-R Assessment*. John Wiley & Sons Inc.
Example articles:	• Gathercole, S. E., Tiffany, C., Briscoe, J., Thorn, A., & ALSPAC team. (2005). Developmental consequences of poor phonological short-term memory function in childhood: A longitudinal study. *Journal of child Psychology and Psychiatry*, *46*(6), 598-611. • Gathercole, S. E., Briscoe, J., Thorn, A., Tiffany, C., & ALSPAC Study Team. (2008). Deficits in verbal long-term memory and learning in children with poor phonological short-term memory skills. *The Quarterly Journal of Experimental Psychology*, *61*(3), 474-490.

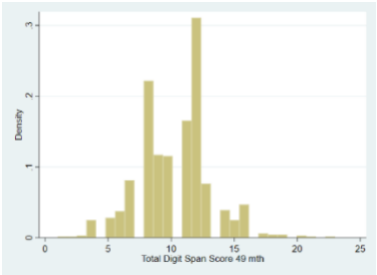
6.3.11 WPPSI – R: Similarities

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Similarities	
Domain:	Verbal ability
Measures:	Verbal comprehension Verbal reasoning Language development
CHC:	Gc (Crystallised intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months)
Administration method:	Trained interviewer; clinical setting; oral response
Procedure:	This test consisted of two parts. First, the child was shown six pairs of images and asked to state the similarity between the two. For the remaining items (7 - 20), the interviewer asked the child whether they knew how two different concepts were related, e.g. “In what way are red and blue alike?”. Items 1 - 12 were worth one point each, with the remaining items worth 0 - 2 points. If items 1, 7, or 13 were answered incorrectly, the interviewer demonstrated the correct answer.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised score (M= 10, SD =3).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf810 (Explore this variable in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	N = 992 Range = 3 - 19 Mean = 9.53 SD = 2.40

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Similarities	
	
Age of participants (weeks):	Mean = 212.39 weeks, SD = 1.63, Range = 207-221
Other sweep and/or cohort:	• BCS70 (age 10) – word similarities • MCS (age 11) – verbal similarities • ALSPAC (age 8.5) – verbal similarities
Source:	Wechsler, D. (1989). *Wechsler Preschool and Primary Scale of Intelligence-Revised.* WPPSI-R. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). *Essentials of WISC-III and WPPSI-R assessment*. John Wiley & Sons Inc.
Example articles:	• Bornstein, M. H., Hahn, C. S., Bell, C., Haynes, O. M., Slater, A., Golding, J., ... & ALSPAC Study Team. (2006). Stability in cognition across early childhood: A developmental cascade. Psychological Science, 17(2), 151-158. • Taylor, C. M., Kordas, K., Golding, J., & Emond, A. M. (2017). Data relating to prenatal lead exposure and child IQ at 4 and 8 years old in the Avon Longitudinal Study of Parents and Children. Neurotoxicology, 62, 224-230.

6.3.12 Short-term memory (Digit Span Test)

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Short-term memory (Digit Span Test)	
Domain:	Verbal memory
Measures:	Short-term memory Memory Span
CHC:	Gsm (Short-term memory)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Years (13 months to 4 years 11 months).
Administration method:	Trained interviewer; clinical setting; questions answered orally

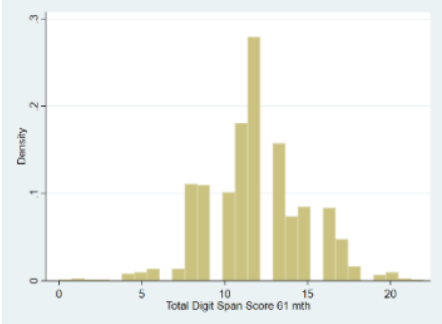
ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Short-term memory (Digit Span Test)	
Procedure:	The child was presented with a spoken series of digits and asked to recall them immediately in sequence. A practice session was administered first. Sequence lists were then read aloud, beginning with a 2-number sequence. If the child correctly answered the first 3 lists of a particular sequence length, the length of the list was increased by one number. The outcome was the maximum digit span reached.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Max digit span reached (0 - 8).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf861 (Explore this variable in Discovery: ALSPAC Children in Focus 4Mth-61Mth Clinics Dataset)
Descriptives:	N = 844 Range = 1 - 23 Mean = 10.36 SD = 2.88 
Age of participants (weeks):	Mean = 212.39 weeks, SD = 1.63, Range = 207 - 221
Other sweep and/or cohort:	• ALSPAC (61 months) • NCDS (children of cohort member, multi-age) • BCS70 (age 10)
Source:	Gathercole, S. E., & Pickering, S. J. (2000). Assessment of working memory in six-and seven-year-old children. *Journal of Educational Psychology*, *92*(2), 377.
Technical resources:	None
Example	• Gathercole, S. E., Briscoe, J., Thorn, A., Tiffany, C., & ALSPAC

ALSPAC Children in Focus (age 49 months; 1996-1997): WPPSI-R Short-term memory (Digit Span Test)	
articles:	Study Team. (2008). Deficits in verbal long-term memory and learning in children with poor phonological short-term memory skills. *The Quarterly Journal of Experimental Psychology*, *61*(3), 474-490.

6.4 ALSPAC Children in Focus Clinic (age 61 months; 1997-1998)

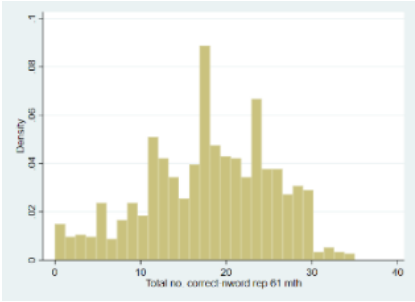
6.4.1 Short-term memory (Digit Span Test)

ALSPAC Children in Focus (age 61 months; 1997-1998): Short-term memory (Digit Span Test)	
Domain:	Verbal memory
Measures:	Short-term memory Memory Span
CHC:	Gsm (Short-term memory)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; questions answered orally
Procedure:	The child was presented with a spoken series of digits and asked to recall them immediately in sequence. A practice session was administered first. Sequence lists were then read aloud, beginning with a 2-number sequence. If the child correctly answered the first 3 lists of a particular sequence length, the length of the list was increased by one number. The outcome was the maximum digit span reached.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Max digit span reached (0 - 8).
Item-level variable(s):	cf870 – cf877
Total score/derived variable(s):	cf872
Descriptives:	N = 963 Range = 0 - 22 Mean = 11.91

ALSPAC Children in Focus (age 61 months; 1997-1998): Short-term memory (Digit Span Test)	
	SD = 2.96 
Age of participants (months):	Mean = 67.19, SD = 0.8, Range = 65-73
Other sweep and/or cohort:	• ALSPAC (49 months) • NCDS (children of cohort member, multi-age) • BCS70 (age 10)
Source:	Gathercole, S. E., & Pickering, S. J. (2000). Assessment of working memory in six-and seven-year-old children. Journal of Educational Psychology, 92(2), 377.
Technical resources:	None
Example articles:	• Gathercole, S. E., Briscoe, J., Thorn, A., Tiffany, C., & ALSPAC Study Team. (2008). Deficits in verbal long-term memory and learning in children with poor phonological short-term memory skills. The Quarterly Journal of Experimental Psychology, 61(3), 474-490.

6.4.2 Short-term memory (Nonword Repetition)

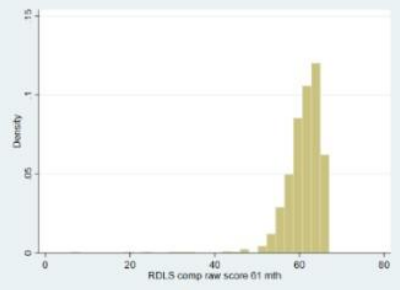
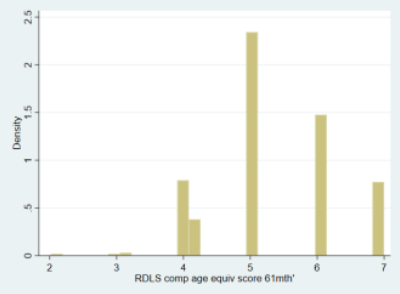
ALSPAC Children in Focus (age 61 months; 1997-1998): Short-term memory (Nonword Repetition)	
Domain:	Verbal memory
Measures:	Short-term memory Memory Span
CHC:	Gsm (Short-term memory)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; questions answered orally

ALSPAC Children in Focus (age 61 months; 1997-1998): Short-term memory (Nonword Repetition)	
Procedure:	The child was presented with 40 nonwords (10 each containing 2, 3, 4 and 5 syllables) played on an audio cassette recorder. The child was asked to repeat each item after it was played. The number of correctly repeated words at each syllable length was recorded.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Number of correct 2 - 5 syllable words (0 - 10) Total number of correct words (0 - 40)
Item-level variable(s):	cf470 – cf476
Total score/derived variable(s):	cf475
Descriptives:	N = 943 Range = 0 – 35 Mean = 17.91 SD = 7.33 
Age of participants (months):	Mean = 67.19, SD = 0.8, Range = 65-73
Other sweep and/or cohort:	• ALSPAC Age 8.5
Source:	Gathercole, S. E., & Baddeley, A. D. (1996). The children's test of nonword repetition. Pearson.
Technical resources:	None
Example articles:	• Gathercole, S. E., Tiffany, C., Briscoe, J., Thorn, A., & ALSPAC team. (2005). Developmental consequences of poor phonological short-term memory function in childhood: A

ALSPAC Children in Focus (age 61 months; 1997-1998): Short-term memory (Nonword Repetition)	
	longitudinal study. Journal of Child Psychology and Psychiatry, 46(6), 598-611. • Gathercole, S. E., Briscoe, J., Thorn, A., Tiffany, C., & ALSPAC Study Team. (2008). Deficits in verbal long-term memory and learning in children with poor phonological short-term memory skills. The Quarterly Journal of Experimental Psychology, 61(3), 474-490.

6.4.3 The Reynell Developmental Language Scale (Verbal Comprehension Subscale)

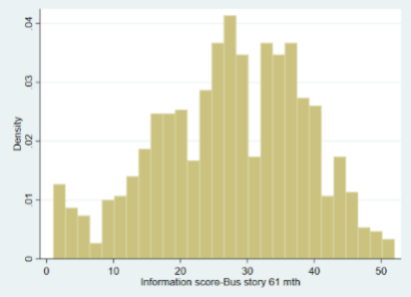
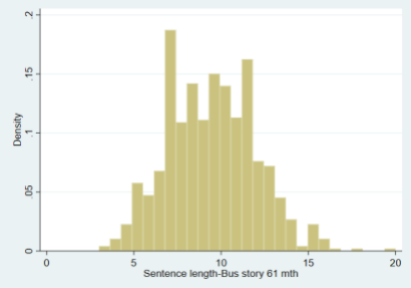
ALSPAC Children in Focus (age 61 months; 1997-1998): The Reynell Developmental Language Scale (Verbal Comprehension Subscale)	
Domain:	Language ability
Measures:	Language development Verbal/lexical comprehension Listening ability
CHC:	Gc (Crystallized Intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months)
Administration method:	Trained interviewer; clinical setting; guided play session; questions answered orally
Procedure:	During a guided play session, the child was presented with a set of toys and asked to carry out a series of tasks of increasing complexity. First, the child was asked to select a specific toy (e.g. "Where is the horse?"). Next the child was asked to manipulate the toy in increasingly complex ways in order to demonstrate understanding, e.g. "Put the spoon in the cup", "Put the white button underneath the cup".
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Raw (0 - 55) and standardised (-11 - 3) scores are available, with the standardised score reflecting how well the children performed in comparison with other children at age 2 years (mean = 0, SD = +/- 1).
Item-level variable(s):	Not readily available.

ALSPAC Children in Focus (age 61 months; 1997-1998): The Reynell Developmental Language Scale (Verbal Comprehension Subscale)	
Total score/derived variable(s):	• cf463 • cf464 • cf465
Descriptives:	Raw score: N = 985 Range = 6 - 67 Mean = 60.77 SD = 4.55  Age equivalised score: N = 982 Range = 2.02 - 7 Mean = 5.33 SD = 0.95 
Age of participants (months):	Mean = 67.19, SD = 0.8, Range = 65-73
Other sweep and/or cohort:	• ALSPAC (Age 2 years/25 months)
Source:	Reynell, J., & Curwen, M. P. (1977). Manual for the Reynell developmental language scales (revised). NFER.
Technical resources:	Reynell, J. K., & Gruber, C. P. (1997). Reynell developmental language scales. Western Psychological Services.
Example articles:	• Roulstone, S., Loader, S., Northstone, K., & Beveridge, M. (2002). The speech and language of children aged 25 months:

ALSPAC Children in Focus (age 61 months; 1997-1998): The Reynell Developmental Language Scale (Verbal Comprehension Subscale)	
	Descriptive data from the Avon Longitudinal Study of Parents and Children. *Early Child Development and Care*, *172*(3), 259-268. • Clegg, J., Law, J., Rush, R., Peters, T. J., & Roulstone, S. (2015). The contribution of early language development to children's emotional and behavioural functioning at 6 years: an analysis of data from the Children in Focus sample from the ALSPAC birth cohort. *Journal of Child Psychology and Psychiatry*, *56*(1), 67-75.

6.4.4 Bus Story

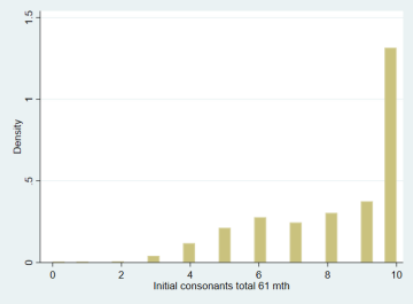
ALSPAC Children in Focus (age 61 months; 1997-1998): Bus Story	
Domain:	Verbal expression
Measures:	Language development Verbal expression Listening ability Communication ability Oral production and fluency
CHC:	Gc (Crystallised Intelligence) Glr (Long-Term Storage and Retrieval)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; answered orally
Procedure:	The interviewer read aloud a story (accompanied with pictures) about a naughty bus. The child was then required to retell the story, using the pictures as support. The child's version was recorded and scored for information content and sentence length.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Marks were awarded for information (0 - 55) and sentence length (0 - 20).
Item-level variable(s):	Not readily available.
Total	cf466 – cf468

ALSPAC Children in Focus (age 61 months; 1997-1998): Bus Story	
score/derived variable(s):	
Descriptives:	Information score: N = 823 Range = 1 - 52 Mean = 27.38 SD = 11.11  Sentence length: N = 772 Range = 3 - 20 Mean = 9.45 SD = 2.53 
Age of participants (months):	Mean = 67.19, SD = 0.8, Range = 65 - 73
Other sweep and/or cohort:	None
Source:	Renfrew CE. Bus Story Test: A test of narrative speech. 4th edition. Winslow Press Ltd: UK 1997.
Technical resources:	None
Example articles:	• Hughes, C., Dunn, J., & White, A. (1998). Trick or treat?: Uneven understanding of mind and emotion and executive dysfunction in “hard-to-manage” preschoolers. The Journal of

ALSPAC Children in Focus (age 61 months; 1997-1998): Bus Story	
	Child Psychology and Psychiatry and Allied Disciplines, 39(7), 981-994. • Clegg, J., Law, J., Rush, R., Peters, T. J., & Roulstone, S. (2015). The contribution of early language development to children's emotional and behavioural functioning at 6 years: an analysis of data from the Children in Focus sample from the ALSPAC birth cohort. Journal of Child Psychology and Psychiatry, 56(1), 67-75.

6.4.5 Initial Consonants Detection Test

ALSPAC Children in Focus (age 61 months; 1997-1998): Initial Consonants Detection Test	
Domain:	Reading ability
Measures:	Reading decoding Spelling ability
CHC:	Grw (Reading/Writing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	Children were presented with 10 lists of three words and were asked to identify which two of three words began with the same initial consonants. The number of correct responses was recorded.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Total number of correct word pairs selected (0 - 10)
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	cf445 -cf449
Descriptives:	N = 983 Range = 0 - 10 Mean = 8.27 SD = 2.04

ALSPAC Children in Focus (age 61 months; 1997-1998): Initial Consonants Detection Test	
	
Age of participants (months):	Mean = 67.19, SD = 0.8, Range = 65-73
Other sweep and/or cohort:	None
Source:	Byrne, Brian, and Ruth Fielding-Barnsley. (1993) Recognition of phoneme invariance by beginning readers. Reading and Writing 5, no. 3: 315-324.
Technical resources:	None
Example articles:	• Gathercole, S. E., Tiffany, C., Briscoe, J., Thorn, A., & ALSPAC team. (2005). Developmental consequences of poor phonological short-term memory function in childhood: A longitudinal study. Journal of child Psychology and Psychiatry, 46(6), 598-611. • Gathercole, S. E., Briscoe, J., Thorn, A., Tiffany, C., & ALSPAC Study Team. (2008). Deficits in verbal long-term memory and learning in children with poor phonological short-term memory skills. The Quarterly Journal of Experimental Psychology, 61(3), 474-490.

6.4.6 Multisyllabic Word Repetition

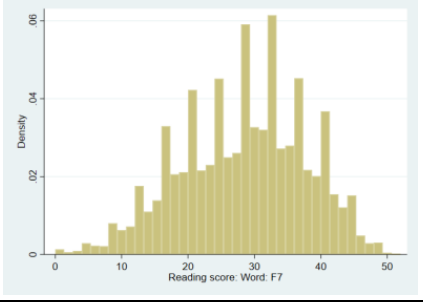
ALSPAC Children in Focus (age 61 months; 1997-1998): Multisyllabic Word Repetition	
Domain:	Verbal repetition
Measures:	Verbal expression
CHC:	Unknown
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).

ALSPAC Children in Focus (age 61 months; 1997-1998): Multisyllabic Word Repetition	
Administration method:	Trained interviewer; clinical setting; questions answered orally
Procedure:	Children were asked to repeat two multisyllabic words: "buttercup" and "dinosaur".
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Each word was scored as not correct/correct (0 - 1).
Item-level variable(s):	cf480 – cf485e
Total score/derived variable(s):	• cf481 • cf482 • cf483
Descriptives:	Not available
Age of participants (months):	Mean = 67.19, SD = 0.8, Range = 65 - 73
Other sweep and/or cohort:	None
Source:	Devised specifically for ALSPAC.
Technical resources:	None
Example articles:	None

6.5 ALSPAC Focus at 7 (age 7.5 years; 1998-2000)

6.5.1 Basic Reading

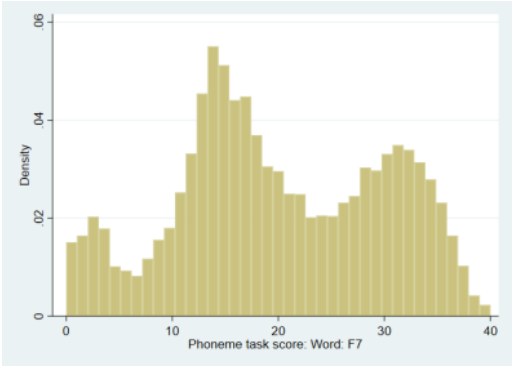
ALSPAC Focus at 7 (age 7.5; 1998-2000): Basic Reading	
Domain:	Reading ability
Measures:	General verbal information Lexical knowledge Reading decoding
CHC:	Gc (Crystallised Intelligence) Grw (Reading/Writing)
CLOSER	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12

ALSPAC Focus at 7 (age 7.5; 1998-2000): Basic Reading	
source:	years 11 months).
Administration method:	Trained interviewer; clinical setting; pointing/answers orally
Procedure:	Comprised of the basic reading subtest of the Wechsler objective reading dimensions (WORD; Wechsler, 1993). First, the child was shown a picture, with four words underneath. They were asked to point to the word that had the same beginning or ending sound as the picture. Second, they were shown a series of three pictures, each with four words beneath, and were asked to select the word that correctly matched the picture. Third, the child was asked to read aloud a list of 48 unconnected words that increased in difficulty. The reading task was stopped if the child made 6 consecutive errors. A total score was computed reflecting the number of items answered correctly.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Total number of correct items (0 - 50).
Item-level variable(s):	f7ws077 – f7ws083
Total score/derived variable(s):	• f7ws076 • f7ws076a (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	N = 8,055 Range = 0 - 52 Mean = 28.22 SD = 9.34 
Age of participants (months):	Mean = 90.5 months, SD =3.83, Range = 82-113
Other sweep	None

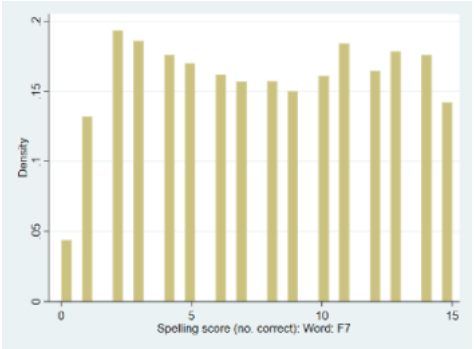
ALSPAC Focus at 7 (age 7.5; 1998-2000): Basic Reading	
and/or cohort:	
Source:	Wechsler, D. (1993). Wechsler objective reading dimensions. London: The Psychological Corporation.
Technical resources:	None
Example articles:	• Gathercole, S. E., Tiffany, C., Briscoe, J., Thorn, A., & ALSPAC team. (2005). Developmental consequences of poor phonological short-term memory function in childhood: A longitudinal study. Journal of Child Psychology and Psychiatry, 46(6), 598-611. • Meadows, S., Herrick, D., Feiler, A., & ALSPAC Study Team. (2007). Improvement in national test reading scores at Key Stage 1; grade inflation or better achievement?. British Educational Research Journal, 33(1), 47-59.

6.5.2 Phoneme Deletion Task

ALSPAC Focus at 7 (age 7.5; 1998-2000): Phoneme Deletion Task	
Domain:	Verbal ability (language repetition)
Measures:	Spelling ability Oral production and fluency Communication ability
CHC:	Gc (Crystallised Intelligence) Grw (Reading/Writing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; answers orally
Procedure:	Children were presented with a word, and then asked to repeat the word, and then say it again with part of the word missing, e.g. 'sour' without the 's' = 'our'. The task began with 2 practice trials, followed by 40 test trials, each of which increased in difficulty. The number of correctly spoken items was recorded.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Correct items (0 - 40).
Item-level	Not readily available.

ALSPAC Focus at 7 (age 7.5; 1998-2000): Phoneme Deletion Task	
variable(s):	
Total score/derived variable(s):	f7ws191 – f7ws220 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	N = 8,074 Range = 0 - 40 Mean = 20.05 SD = 9.53 
Age of participants (months):	Mean = 90.5 months, SD =3.83, Range = 82 - 113
Other sweep and/or cohort:	None
Source:	Rosner, J., & Simon, D. P. (1971). The auditory analysis test: An initial report. *Journal of Learning disabilities*, *4*(7), 384-392.
Technical resources:	None
Example articles:	• Powers, N. R., Eicher, J. D., Butter, F., Kong, Y., Miller, L. L., Ring, S. M., ... & Gruen, J. R. (2013). Alleles of a polymorphic ETV6 binding site in DCDC2 confer risk of reading and language impairment. The American Journal of Human Genetics, 93(1), 19-28. • Eicher, J. D., Powers, N. R., Miller, L. L., Mueller, K. L., Mascheretti, S., Marino, C., ... & Pennington, B. F. (2014). Characterization of the DYX2 locus on chromosome 6p22 with reading disability, language impairment, and IQ. Human genetics, 133(7), 869-881.

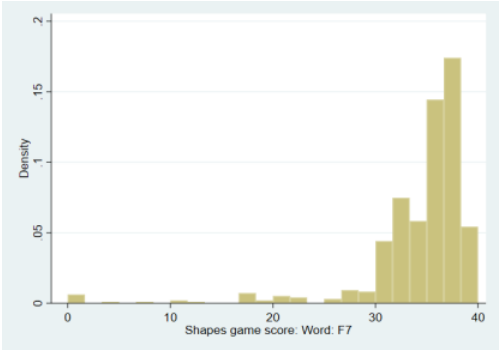
6.5.3 Spelling Task

ALSPAC Focus at 7 (age 7.5; 1998-2000): Spelling Task	
Domain:	Verbal ability (spelling)
Measures:	Spelling ability
CHC:	Grw (Reading/Writing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	Based on a pilot study of several hundred children (Peter Bryant and Terezinha Nunes, Personal Communication). The interviewer asked the child to spell 15 words, both regular and irregular, that increased in difficulty. For each word, the interviewer i) read it aloud, and ii) used it in a sentence. The child was asked to write down the correct spelling of the word.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	The main score was calculated by summing the correct number of items (0 - 15).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	f7ws116 – f7ws122 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	N = 7,912 Range = 0 - 15 Mean = 7.82 SD = 4.38 
Age of participants	Mean = 90.5 months, SD =3.83, Range = 82-113

ALSPAC Focus at 7 (age 7.5; 1998-2000): Spelling Task	
(months):	
Other sweep and/or cohort:	• ALSPAC age 9
Source:	(Peter Bryant and Terezinha Nunes, Personal Communication)
Technical resources:	None
Example articles:	• Paracchini D Phil, S., Steer, C. D., Buckingham, L. L., Morris, A. P., Ring, S., Scerri D Phil, T., ... & Monaco, A. P. (2008). Association of the KIAA0319 dyslexia susceptibility gene with reading skills in the general population. American Journal of Psychiatry, 165(12), 1576-1584. • Schoemaker, M. M., Lingam, R., Jongmans, M. J., van Heuvelen, M. J., & Emond, A. (2013). Is severity of motor coordination difficulties related to co-morbidity in children at risk for developmental coordination disorder? Research in Developmental Disabilities, 34(10), 3084-3091.

6.5.4 Letter Decision Task

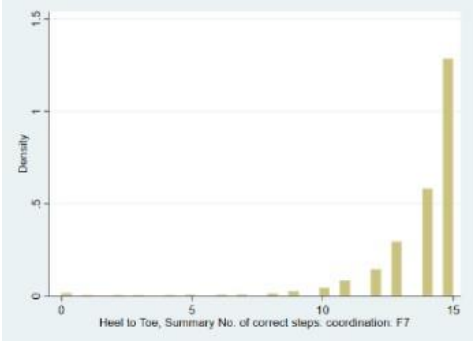
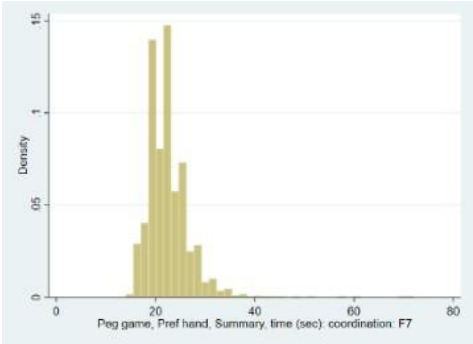
ALSPAC Focus at 7 (age 7.5; 1998-2000): Letter Decision Task	
Domain:	Visual scanning
Measures:	Visual scanning Visual processing
CHC:	Gs (Processing Speed) Gv (Visual Processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	The child was presented with a series of shapes, half of which were real letters, and half which were non-letters (including reversed letters). They were instructed to go through the list, placing a tick next to genuine letters and a cross next to non-letters. The speed of completion was recorded. This test was completed only by children who had struggled with other tasks, and thus the sample is considerably biased.
Link to	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-

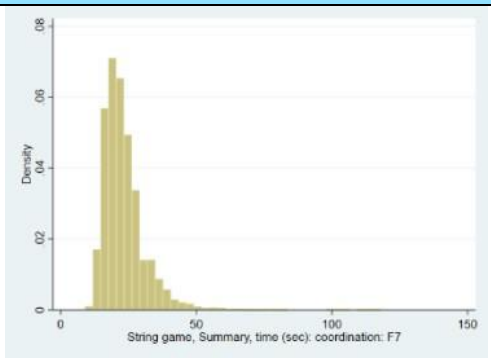
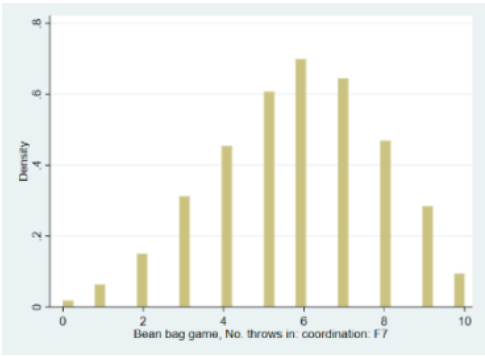
ALSPAC Focus at 7 (age 7.5; 1998-2000): Letter Decision Task	
questionnaire:	measures/
Scoring:	The main score was the number of correct responses (0 - 40).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	f7ws300 – f7ws348 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	N = 586 Range = 0 - 40 Mean = 34.19 SD = 5.71 
Age of participants (months):	Mean = 90.5 months, SD =3.83, Range = 82-113
Other sweep and/or cohort:	None
Source:	(Gathercole & Baddeley, 1997, personal communication)
Technical resources:	None
Example articles:	None

6.5.5 Motor Ability Task

ALSPAC Focus at 7 (age 7.5; 1998-2000): Motor Ability Task	
Domain:	Motor skills
Measures:	Motor skills Manual dexterity Balance

ALSPAC Focus at 7 (age 7.5; 1998-2000): Motor Ability Task	
CHC:	Gp (Psychomotor abilities)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; physical tasks
Procedure:	Motor ability was assessed using the Movement-assessment battery for children (Henderson & Sugden, 1992). The three following sub-tests were administered: i) manual dexterity (placing pegs and threading lace), ii) ball skills (bean bags), iii) balance (heel-toe walking). For the pegs task, the child had to insert 12 pegs, one at a time, into a peg board. This was done using the preferred and non-preferred hand, and the time taken for each was recorded. For the threading lace task, the child was asked to thread a lace through holes in a wooden board. The task was demonstrated by the interviewer, and a practice trial was performed. The time taken to complete the task was recorded. For the ball skills task, the child was tasked with throwing a bean bag (underarm) into a box, which was placed 6 feet away from the child. After demonstrations and five practice throws, the number of successful throws out of 10 were recorded. For the balance (heel-toe) task, the child was asked to walk along a taped straight line, without leaving any gaps between their heel and toe. The child was scored on the total number of "successful" steps taken.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Manual dexterity: The time to complete each task was recorded: • 0 - 72 seconds (peg game) • 0 - 118 seconds (threading lace) Ball skills (bean bag) task: The number of successful throws was recorded (0 – 10). Balance (heel-toe walking) task: The number of successful steps

ALSPAC Focus at 7 (age 7.5; 1998-2000): Motor Ability Task	
	taken was recorded (0 – 15)
Item-level variable(s):	f7cr015 – f7cr331
Total score/derived variable(s):	f7cr500 – f7cr502 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	Balance (heel-toe walking): N = 7,305 Range = 0 - 15 Mean = 13.79 SD = 2.08  Manual dexterity - Peg task: N = 7,256 Range = 14 - 72 Mean = 22.54 SD = 3.98  Manual dexterity - Threading lace task: N = 6,658 Range = 9 - 118 Mean = 23.32 SD = 8.20

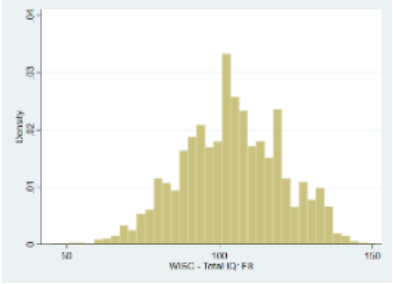
ALSPAC Focus at 7 (age 7.5; 1998-2000): Motor Ability Task	
	 Ball skills (bean bag) task: N = 7,314 Range = 0 - 10 Mean = 5.82 SD = 2.07 
Age of participants (months):	Mean = 90.5 months, SD =3.83, Range = 82-113
Other sweep and/or cohort:	None
Source:	Sheila, E. H., & David, A. S. (1992). Movement-assessment battery for children: manual. London: The Psychological Corporation.
Technical resources:	None
Example articles:	• Lingam, R., Hunt, L., Golding, J., Jongmans, M., & Emond, A. (2009). Prevalence of developmental coordination disorder using the DSM-IV at 7 years of age: a UK population-based study. Pediatrics, 123(4), e693-e700. • Green, D., Lingam, R., Mattocks, C., Riddoch, C., Ness, A., & Emond, A. (2011). The risk of reduced physical activity in children with probable Developmental Coordination Disorder: a prospective longitudinal study. Research in Developmental

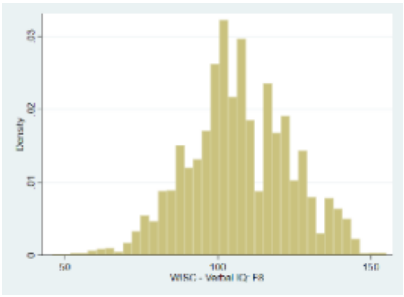
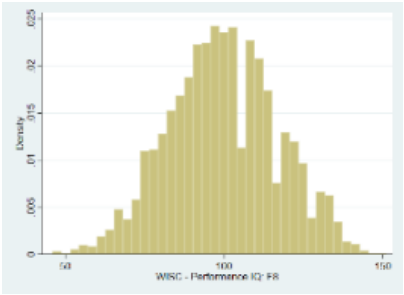
ALSPAC Focus at 7 (age 7.5; 1998-2000): Motor Ability Task
Disabilities, 32(4), 1332-1342.

6.6 ALSPAC Focus at 8 (age 8.5 years; 1999-2001)

6.6.1 Wechsler Intelligence Scale for Children (WISC-III)

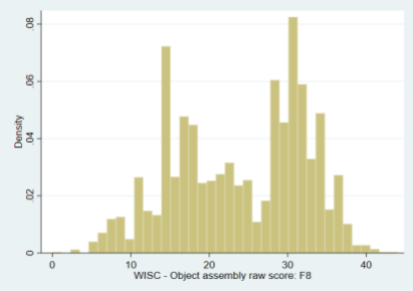
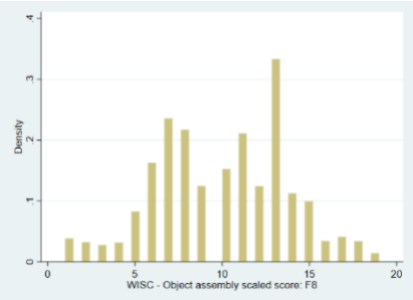
ALSPAC Focus at 8 (age 8.5; 1999-2001): Wechsler Intelligence Scale for Children (WISC-III)	
Domain:	Verbal and non-verbal ability
Measures:	General cognitive ability Verbal ability Non-verbal/performance ability
CHC:	G (General ability)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting
Procedure:	The WISC-III is a measure of cognitive functioning designed for children aged 6-17 years. It is comprised of two scales, verbal and performance (non-verbal), and each of these scales contains 5 subtests. The verbal subtests are: i) vocabulary, ii) similarities, iii) arithmetic, iv) information, v) comprehension. The performance subtests are: i) object assembly, ii) coding, iii) block design, iv) picture arrangement, v) picture completion. Each subtest is described individually in the sections below. A short-form measure of the WISC was administered to reduce burden/fatigue on the children (with the exception of the coding

ALSPAC Focus at 8 (age 8.5; 1999-2001): Wechsler Intelligence Scale for Children (WISC-III)	
	test which was administered in full). Scores from this short-form version can be transformed to approximate scores on the full version as follows; multiplying by 2 scores for picture completion, information, arithmetic, vocabulary, comprehension and picture arrangement; multiplying by 5/3 for similarities; and multiplying by 3/2 for object assembly and block design. The WISC-III provides standard scores (M = 100, SD = 15), on verbal IQ, performance IQ and fullscale IQ. Scores on the individual subtests were standardised (M = 10, SD = 3). Raw scores were converted into scale scores using tables provided in the WISC-III manual. If fewer than 3 subtests were completed by the child, verbal, performance and fullscale IQ were not computed for that child. If 4 out of 5 subscales were completed on the verbal/performance scales, the mean of the 4 scales was substituted in for the missing 5th. This prorating strategy is a standard practice when using WISC-III.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised score (M = 100, SD = 15).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	f8ws020 - f8ws155 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	Total IQ: N = 7,348 Range = 45 - 151 Mean = 103.97 SD = 16.53  Verbal IQ:

ALSPAC Focus at 8 (age 8.5; 1999-2001): Wechsler Intelligence Scale for Children (WISC-III)	
	N = 7,379 Range = 46 – 155 Mean = 106.95  Performance IQ: N = 7,371 Range = 46 – 151 Mean = 99.46 SD = 17.12 
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89 - 127
Other sweep and/or cohort:	None
Source:	Wechsler, D. (1991). WISC-III: Wechsler intelligence scale for children: Manual. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). Essentials of WISC-III and WPPSI-R assessment. John Wiley & Sons Inc.
Example articles:	• Northstone, K., Joinson, C., Emmett, P., Ness, A., & Paus, T. (2012). Are dietary patterns in childhood associated with IQ at 8 years of age? A population-based cohort study. Journal of Epidemiology and Community Health, 66(7), 624-628. • Bornstein, M. H., Hahn, C. S., & Wolke, D. (2013). Systems and cascades in cognitive development and academic achievement. Child Development, 84(1), 154-162.

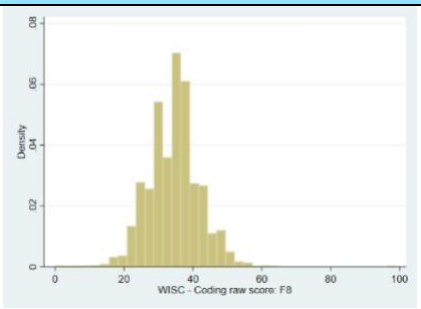
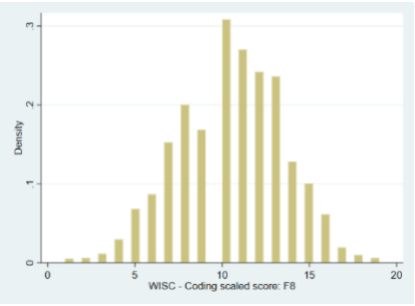
6.6.2 WISC-III: Object Assembly

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Object Assembly	
Domain:	Non-verbal reasoning
Measures:	Spatial visualization Non-verbal reasoning Simultaneous processing Visual-motor coordination Dexterity Non-verbal concept formation
CHC:	Gf (Fluid intelligence) Gs (Processing speed)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; physical task
Procedure:	The child was presented with the pieces of a puzzle in a standard arrangement and was instructed to fit the pieces together to form a meaningful whole within 90 seconds. A total of six trials were administered. The examiner demonstrated using a sample puzzle before the test began. On the first puzzle, the examiner demonstrated the correct arrangement if the child failed to complete, however no second trial was given.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Scores consist of the correct number of junctures (where two pieces join), with bonus points added for correctly completed trials. Raw scores are converted into scale scores using tables provided in the WISC manual (M= 10, SD =3).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	f8ws030 – f8ws060 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	Raw score: N = 6,983 Range = 0 - 44 Mean = 23.96

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Object Assembly	
	SD = 8.40  Scaled score: N = 6,984 Range = 1 - 19 Mean = 9.98 SD = 3.77 
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89-127
Other sweep and/or cohort:	• ALSPAC (Age 4)
Source:	Wechsler, D. (1991). WISC-III: Wechsler intelligence scale for children: Manual. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). Essentials of WISC-III and WPPSI-R assessment. John Wiley & Sons Inc.
Example articles:	• Horwood, J., Salvi, G., Thomas, K., Duffy, L., Gunnell, D., Hollis, C., ... & Zammit, S. (2008). IQ and non-clinical psychotic symptoms in 12-year-olds: results from the ALSPAC birth cohort. The British Journal of Psychiatry, 193(3), 185-191. • Northstone, K., Joinson, C., Emmett, P., Ness, A., & Paus, T. (2012). Are dietary patterns in childhood associated with IQ at 8 years of age? A population-based cohort study. Journal of Epidemiology and Community Health, 66(7), 624-628.

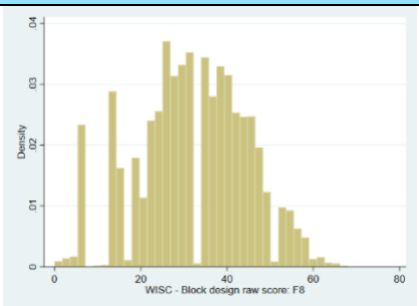
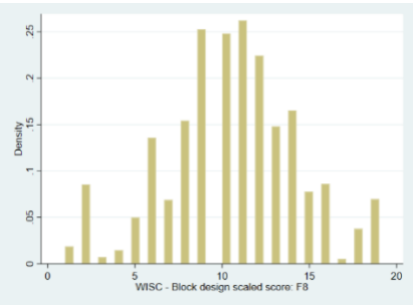
6.6.3 WISC-III: Digit Symbol Coding

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Digit Symbol Coding	
Domain:	Non-verbal sequencing
Measures:	Visual-motor coordination/speed Short-term visual memory Cognitive flexibility Visual sequencing Concentration
CHC:	Gv (Visual Processing) Gs (Processing Speed)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	The child was shown a key which contained geometric shapes, each of which was marked by a symbol. Next they were presented with rows and columns containing only the geometric shapes, and were tasked with marking each one with the appropriate symbol. Sample items were administered first. Duration: The actual trial lasted for 120 seconds.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point was awarded for each correctly drawn symbol, and these were converted to standardised scores (M= 10, SD =3) using the WISC manual.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	f8ws027 – f8ws057 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	Raw score: N = 7,404 Range = 0 - 99 Mean = 34.52 SD = 7.45

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Digit Symbol Coding	
	 Scaled score: N = 7,403 Range = 1 - 19 Mean = 10.49 SD =3.04 
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89 - 127
Other sweep and/or cohort:	None
Source:	Wechsler, D. (1991). WISC-III: Wechsler intelligence scale for children: Manual. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). Essentials of WISC-III and WPPSI-R assessment. John Wiley & Sons Inc.
Example articles:	• Horwood, J., Salvi, G., Thomas, K., Duffy, L., Gunnell, D., Hollis, C., ... & Zammit, S. (2008). IQ and non-clinical psychotic symptoms in 12-year-olds: results from the ALSPAC birth cohort. The British Journal of Psychiatry, 193(3), 185-191. • Bornstein, M. H., Hahn, C. S., & Wolke, D. (2013). Systems and cascades in cognitive development and academic achievement. Child Development, 84(1), 154-162.

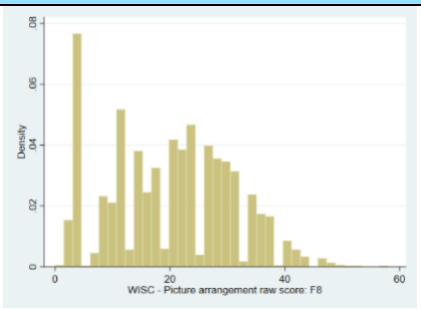
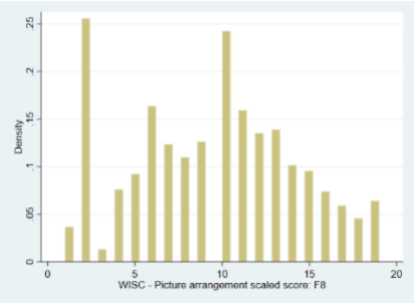
6.6.4 WISC-III: Block Design

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Block Design	
Domain:	Non-verbal ability
Measures:	Planning Spatial visualisation Visual motor coordination Simultaneous processing Synthesis (part-whole relationships) Non-verbal concept formation
CHC:	Gs (Processing Speed) Gv (Visual Processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; physical task
Procedure:	The child was presented with an image or model that depicted a pattern and was tasked with recreating the pattern with one- and two-colour blocks (white and red). The test contained 14 designs, and the child was allowed two attempts at each design. Points were awarded for completion, and bonus points were awarded based on time
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Raw scores were converted into scale scores using tables provided in the WISC manual (M= 10, SD =3).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	f8ws029 – f8ws059 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	Raw score: N = 7,324 Range = 0 - 68 Mean = 32.19 SD = 12.50

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Block Design	
	 Scaled score: N = 7,362 Range = 1 - 19 Mean = 10.53 SD = 3.81 
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89-127
Other sweep and/or cohort:	• ALSPAC (Age 4) • MCS (age 5) – BAS pattern construction • MCS (age 7) – BAS pattern construction
Source:	Wechsler, D. (1991). WISC-III: Wechsler intelligence scale for children: Manual. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). Essentials of WISC-III and WPPSI-R assessment. John Wiley & Sons Inc.
Example articles:	• Northstone, K., Joinson, C., Emmett, P., Ness, A., & Paus, T. (2012). Are dietary patterns in childhood associated with IQ at 8 years of age? A population-based cohort study. Journal of Epidemiology and Community Health, 66(7), 624-628. • Bornstein, M. H., Hahn, C. S., & Wolke, D. (2013). Systems and cascades in cognitive development and academic achievement. Child Development, 84(1), 154-162.

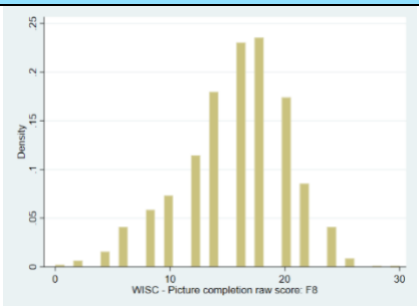
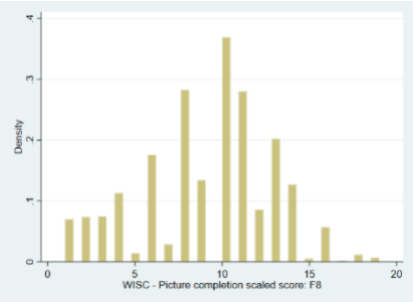
6.6.5 WISC-III: Picture Arrangement

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Picture Arrangement	
Domain:	Non-verbal reasoning
Measures:	Sequential reasoning Planning Non-verbal reasoning Social intelligence Simultaneous processing
CHC:	Gc (Crystallised intelligence) Gf (Fluid intelligence) Gv (Visual processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; physical task
Procedure:	The child was presented with a set of cartoon images and was asked to arrange them in an order that made a sensible story. A sample item was administered prior to the full trial, which consisted of 14 sequences. Two trials were given for the first two items. For item 1 only, the examiner demonstrated the correct sequence if the child failed to do so.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Items 2-4 were worth 2 points each, with bonus points for completion time for items 3-14. Raw scores were converted into standardised scores (M= 10, SD =3) using the WISC manual.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	f8ws028 – f8ws058 (Explore these variables in Discovery: ALSPAC Focus at 8 Clinic Dataset)
Descriptives:	Raw score: N = 7,308 Range = 0 - 58 Mean = 20.12 SD = 10.74

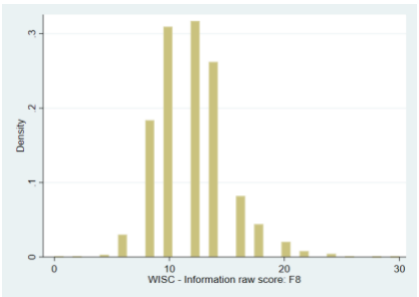
ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Picture Arrangement	
	 Scaled score: N = 7,309 Range = 1 - 19 Mean = 9.41 SD = 4.77 
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89-127
Other sweep and/or cohort:	None
Source:	Wechsler, D. (1991). WISC-III: Wechsler intelligence scale for children: Manual. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). Essentials of WISC-III and WPPSI-R assessment. John Wiley & Sons Inc.
Example articles:	• Northstone, K., Joinson, C., Emmett, P., Ness, A., & Paus, T. (2012). Are dietary patterns in childhood associated with IQ at 8 years of age? A population-based cohort study. Journal of Epidemiology and Community Health, 66(7), 624-628. • Bornstein, M. H., Hahn, C. S., & Wolke, D. (2013). Systems and cascades in cognitive development and academic achievement. Child Development, 84(1), 154-162.

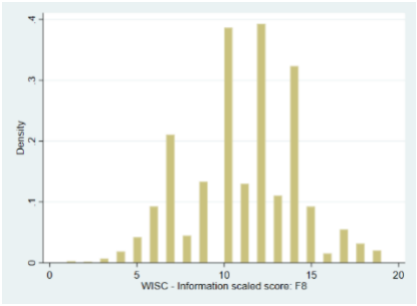
6.6.6 WISC-III: Picture Completion

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Picture Completion	
Domain:	Non-verbal visualisation
Measures:	Simultaneous processing Visual organisation Visual recognition
CHC:	Gv (Visual processing) Gc (Crystallised intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; child points to answer
Procedure:	The child was shown an image and then asked to point to or name the important missing part. For instance, a picture might have shown a car with a missing wheel. The child had 30 seconds to answer each item. Sample items (number differs with age) were provided to ensure the child understood the test.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point was awarded for each correct response within the time-limit. Raw scores were converted into scale scores using tables provided in the WISC manual (M = 10, SD = 3).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	f8ws026 -f8ws056 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	Raw score: N = 7,372 Range = 0 - 30 Mean = 15.73 SD = 4.64

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Picture Completion	
	 Scaled score: N = 7,384 Range = 1 - 19 Mean = 9.10 SD = 3.71 
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89-127
Other sweep and/or cohort:	• ALSPAC (Age 4)
Source:	Wechsler, D. (1991). WISC-III: Wechsler intelligence scale for children: Manual. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). Essentials of WISC-III and WPPSI-R assessment. John Wiley & Sons Inc.
Example articles:	• Horwood, J., Salvi, G., Thomas, K., Duffy, L., Gunnell, D., Hollis, C., ... & Zammit, S. (2008). IQ and non-clinical psychotic symptoms in 12-year-olds: results from the ALSPAC birth cohort. The British Journal of Psychiatry, 193(3), 185-191. • Northstone, K., Joinson, C., Emmett, P., Ness, A., & Paus, T. (2012). Are dietary patterns in childhood associated with IQ at 8 years of age? A population-based cohort study. Journal of Epidemiology and Community Health, 66(7), 624-628.

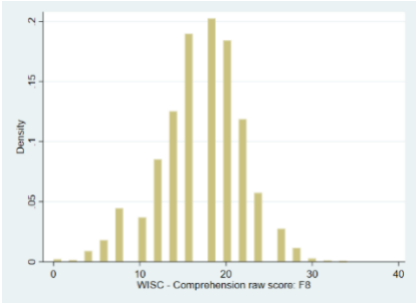
6.6.7 WISC-III: Information

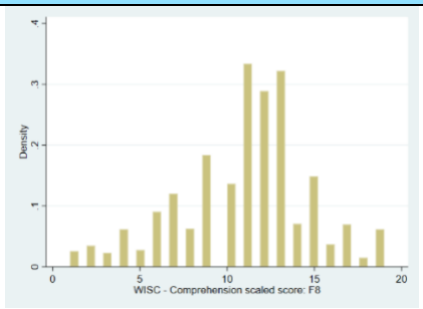
ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Information	
Domain:	Verbal ability
Measures:	General verbal information Verbal comprehension Listening ability Auditory/visual perception Oral production and fluency
CHC:	Gc (Crystallised intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; child points to answer
Procedure:	This test consisted of oral, 'general knowledge' questions. One point was awarded for each correct answer.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Raw scores were converted into scale scores using tables provided in the WISC manual (M= 10, SD =3)
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	f8ws020 – f8ws050 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	Raw score: N = 7,389 Range = 0 - 30 Mean = 11.88 SD = 3.13  Scaled score: N = 7,409 Range = 1 - 19

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Information	
	Mean = 11.08 SD = 3.12 
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89-127
Other sweep and/or cohort:	• ALSPAC (Age 4)
Source:	Wechsler, D. (1991). WISC-III: Wechsler intelligence scale for children: Manual. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). Essentials of WISC-III and WPPSI-R assessment. John Wiley & Sons Inc.
Example articles:	• Horwood, J., Salvi, G., Thomas, K., Duffy, L., Gunnell, D., Hollis, C., ... & Zammit, S. (2008). IQ and non-clinical psychotic symptoms in 12-year-olds: results from the ALSPAC birth cohort. The British Journal of Psychiatry, 193(3), 185-191. • Northstone, K., Joinson, C., Emmett, P., Ness, A., & Paus, T. (2012). Are dietary patterns in childhood associated with IQ at 8 years of age? A population-based cohort study. Journal of Epidemiology and Community Health, 66(7), 624-628.

6.6.8 WISC-III: Comprehension

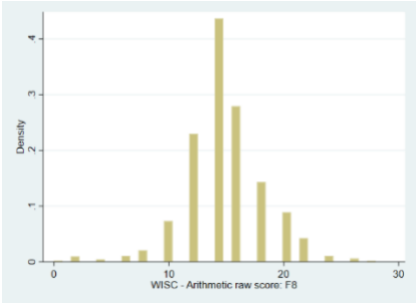
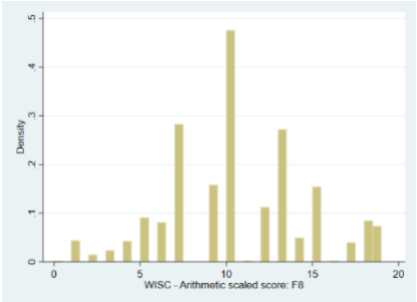
ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Comprehension	
Domain:	Verbal comprehension
Measures:	Verbal comprehension Verbal reasoning Verbal expression
CHC:	Gc (Crystallised intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Comprehension	
Administration method:	Trained interviewer; clinical setting; child answers orally
Procedure:	The child was asked a series of questions based on his or her understanding of general concepts, e.g. "Why do people brush their teeth?", "Why can birds fly, but cats can't?". Interviewers were allowed to repeat questions if the child did not understand. Responses were scored on a 0 - 2 metric. If the child spontaneously improved their answer, this was accepted.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Responses were scored on a 0 - 2 metric. Raw scores were converted into scale scores using tables provided in the WISC manual (M = 10, SD = 3)
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	f8ws024 – f8ws054 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	Raw score: N = 7,328 Range = 0 - 34 Mean = 17.13 SD = 4.77  Scaled score: N = 7,334 Range = 1 - 19 Mean = 10.98 SD = 3.71

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Comprehension	
	
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89-127
Other sweep and/or cohort:	• ALSPAC (Age 4)
Source:	Wechsler, D. (1991). WISC-III: Wechsler intelligence scale for children: Manual. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). Essentials of WISC-III and WPPSI-R assessment. John Wiley & Sons Inc.
Example articles:	• Horwood, J., Salvi, G., Thomas, K., Duffy, L., Gunnell, D., Hollis, C., ... & Zammit, S. (2008). IQ and non-clinical psychotic symptoms in 12-year-olds: results from the ALSPAC birth cohort. The British Journal of Psychiatry, 193(3), 185-191. • Bornstein, M. H., Hahn, C. S., & Wolke, D. (2013). Systems and cascades in cognitive development and academic achievement. Child Development, 84(1), 154-162.

6.6.9 WISC-III: Arithmetic

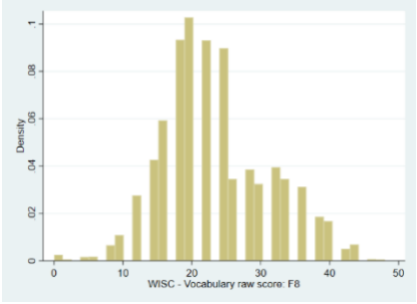
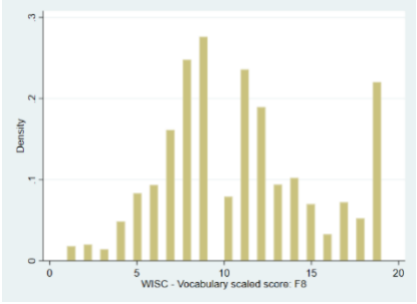
ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Arithmetic	
Domain:	Arithmetic
Measures:	Numeric reasoning Sequential processing
CHC:	Gq (Quantitative Knowledge)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper/oral answers
Procedure:	The test contains 24 items. For items 1-5, the child responds orally to questions posed by the examiner that are related to picture

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Arithmetic	
	stimuli. For items 6-18 the child solves problems that are read aloud by the examiner. For items 19-24 the child reads aloud problems that are written in a stimulus book, then proceeds to solve them.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Raw scores were converted into scale scores using tables provided in the WISC manual (M= 10, SD =3).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	f8ws022 – f8ws052 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	Raw score: N = 7,332 Range = 0 - 28 Mean = 14.77 SD = 3.45  Scaled score: N = 7,393 Range = 0 - 19 Mean = 10.45 SD = 4.11 
Age of	Mean = 103.82 months, SD = 3.92, Range = 89 - 127

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Arithmetic	
participants (months):	
Other sweep and/or cohort:	• ALSPAC Age 4
Source:	Wechsler, D. (1991). WISC-III: Wechsler intelligence scale for children: Manual. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). Essentials of WISC-III and WPPSI-R assessment. John Wiley & Sons Inc.
Example articles:	• Northstone, K., Joinson, C., Emmett, P., Ness, A., & Paus, T. (2012). Are dietary patterns in childhood associated with IQ at 8 years of age? A population-based cohort study. Journal of Epidemiology and Community Health, 66(7), 624-628. • Bornstein, M. H., Hahn, C. S., & Wolke, D. (2013). Systems and cascades in cognitive development and academic achievement. Child Development, 84(1), 154-162.

6.6.10 WISC-III: Vocabulary

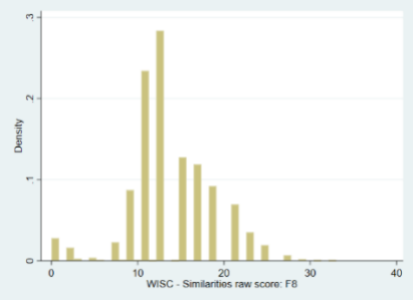
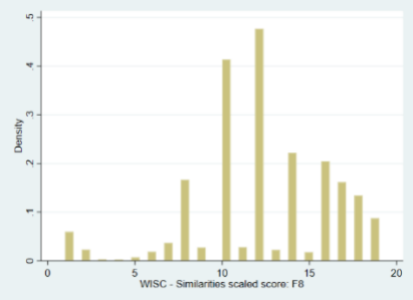
ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Vocabulary	
Domain:	Verbal ability
Measures:	Verbal comprehension Lexical knowledge Long-term memory Language development
CHC:	Gc (Crystallised intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers
Procedure:	The interviewer read aloud a list of words, asking the child to define each one in turn. Responses were scored on a 0 - 2 scale depending on the quality of response.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Responses were scored on a 0 - 2 scale depending on the quality of response. Raw scores were converted into scale scores using tables provided in the WISC manual (M = 10, SD = 3)

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Vocabulary	
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	f8ws023 – f8ws053 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	Raw score: N = 7,371 Range = 0 - 48 Mean = 23.30 SD = 7.87  Scaled score: N = 7,376 Range = 1 - 19 Mean = 10.94 SD = 4.39 
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89 - 127
Other sweep and/or cohort:	• NSHD Age 8 and 11 – similar tests • BCS70 Age 10 – similar British Abilities Scale task
Source:	Wechsler, D. (1991). WISC-III: Wechsler intelligence scale for children: Manual. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). Essentials of WISC-III and WPPSI-R assessment. John Wiley & Sons Inc.

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Vocabulary	
Example articles:	• Horwood, J., Salvi, G., Thomas, K., Duffy, L., Gunnell, D., Hollis, C., ... & Zammit, S. (2008). IQ and non-clinical psychotic symptoms in 12-year-olds: results from the ALSPAC birth cohort. The British Journal of Psychiatry, 193(3), 185-191. • Northstone, K., Joinson, C., Emmett, P., Ness, A., & Paus, T. (2012). Are dietary patterns in childhood associated with IQ at 8 years of age? A population-based cohort study. Journal of Epidemiology and Community Health, 66(7), 624-628.

6.6.11 WISC-III: Similarities

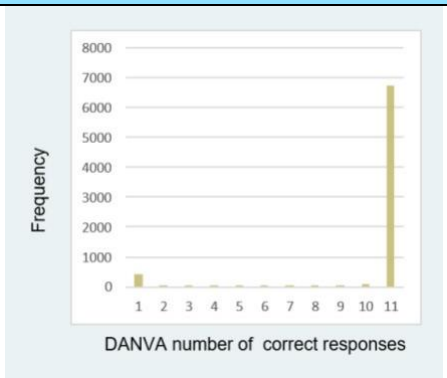
ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Similarities	
Domain:	Verbal ability
Measures:	Verbal comprehension Verbal reasoning Language development
CHC:	Gc (Crystallised intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers
Procedure:	The interviewer asked the child whether they knew how two different things or concepts were related, e.g. “In what way are hope and fear alike?”.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Items 1-5 were worth one point each, with the remaining items worth 0 - 2 points. Raw scores were converted into scale scores using tables provided in the WISC manual (M = 10, SD = 3)
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	f8ws021 – f8ws051 (Explore these variables in Discovery: ALSPAC Focus at 7 Clinic Dataset)
Descriptives:	Raw score: N = 7,404 Range = 0 - 33

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Similarities	
	Mean = 13.86 SD = 4.91  Scaled score: N = 7,409 Range = 1 - 19 Mean = 12.32 SD = 3.99 
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89 - 127
Other sweep and/or cohort:	• ALSPAC (age 4) – both verbal and picture similarities • BCS70 (age 10) – word similarities • MCS (age 11) – verbal similarities
Source:	Wechsler, D. (1991). WISC-III: Wechsler intelligence scale for children: Manual. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). Essentials of WISC-III and WPPSI-R assessment. John Wiley & Sons Inc.
Example articles:	• Horwood, J., Salvi, G., Thomas, K., Duffy, L., Gunnell, D., Hollis, C., ... & Zammit, S. (2008). IQ and non-clinical psychotic symptoms in 12-year-olds: results from the ALSPAC birth cohort. The British Journal of Psychiatry, 193(3), 185-191. • Northstone, K., Joinson, C., Emmett, P., Ness, A., & Paus, T. (2012). Are dietary patterns in childhood associated with IQ at 8 years of age? A population-based cohort study. Journal of

ALSPAC Focus at 8 (age 8.5; 1999-2001): WISC-III Similarities	
	Epidemiology and Community Health, 66(7), 624-628.

6.6.12 Diagnostic Analysis of Nonverbal Accuracy Scale (DANVA): Faces subtest

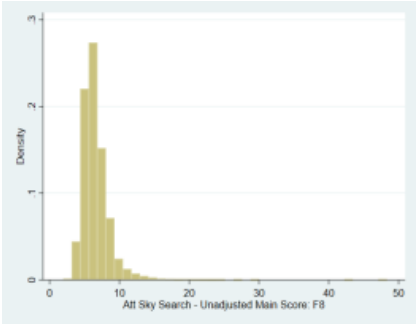
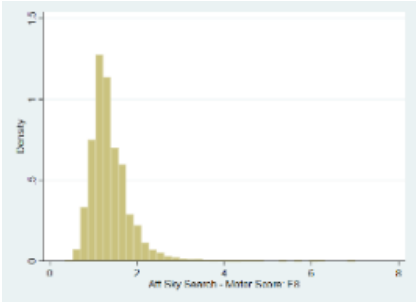
ALSPAC Focus at 8 (age 8.5; 1999-2001): DANVA Faces subtest	
Domain:	Social cognition
Measures:	Nonverbal social information processing Nonverbal receiving ability Nonverbal sending accuracy
CHC:	Gkn (General domain-specific knowledge)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; computer-assisted personal interview (CAPI)
Procedure:	The child was sat in front of a computer screen, and the interviewer explained that they would be shown faces that depicted one of four emotions: happy, sad, angry, or fearful. The child was then shown 24 faces, each for approximately 2 seconds, and asked which of the four emotions corresponded to the faces. Faces were either high or low intensity (i.e. emotion was more or less obvious).
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	The main outcome variable was the number of correct responses (0 - 24). In cases where there was only one missing value (N = 67), it was assumed the child scored correctly.
Item-level variable(s):	f8dv400 – f8dv446a
Total score/derived variable(s):	F8DV103 (Explore these variables in Discovery: ALSPAC Focus at 8 Clinic Dataset)
Descriptives:	N = 7303 Range = 0 - 24 Mean = 22.45

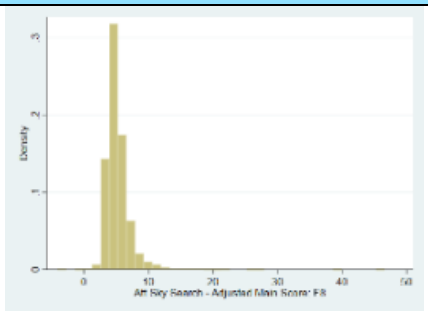
ALSPAC Focus at 8 (age 8.5; 1999-2001): DANVA Faces subtest	
	
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89 - 127
Other sweep and/or cohort:	None
Source:	Nowicki, S., & Duke, M. P. (1994). Individual differences in the nonverbal communication of affect: The Diagnostic Analysis of Nonverbal Accuracy Scale. Journal of Nonverbal Behavior, 18(1), 9- 35.
Technical resources:	Nowicki, S. (2000). Manual for the receptive tests of the Diagnostic Analysis of Nonverbal Accuracy 2. Atlanta, GA: Department of Psychology, Emory University. https://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Example articles:	• Thompson, A., Sullivan, S., Heron, J., Thomas, K., Zammit, S., Horwood, J., ... & Harrison, G. (2011). Childhood facial emotion recognition and psychosis-like symptoms in a nonclinical population at 12 years of age: results from the ALSPAC birth cohort. Cognitive Neuropsychiatry, 16(2), 136-157. • Barona, M., Kothari, R., Skuse, D., & Micali, N. (2015). Social communication and emotion difficulties and second to fourth digit ratio in a large community-based sample. Molecular Autism, 6(1), 68.

6.6.13 Test of Everyday Attention for Children (TEA-Ch): Sky Search

ALSPAC Focus at 8 (age 8.5; 1999-2001): TEA-Ch Sky Search	
Domain:	Attention
Measures:	Selective attention

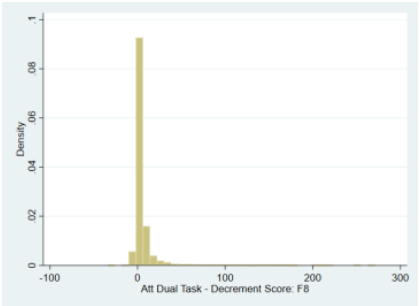
ALSPAC Focus at 8 (age 8.5; 1999-2001): TEA-Ch Sky Search	
	Concentration Mental speed Visual scanning
CHC:	Gs (Processing Speed) Gps (Psychomotor Speed) Gv (Visual Processing) Gsm (Short-Term Memory)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	The child was presented with an array of non-identical and identical spaceships and was tasked with circling pairs of identical spaceships as quickly as possible, whilst trying to avoid any errors. The interviewer provided a demonstration, and the child worked through a practice sheet before commencing the test. After the practice sheet, the child was presented with a larger sheet and asked to do the same (20 identical pairs). The above task was then repeated, without the non-identical pairs of ships. The aim was to identify how quickly the child could complete the task, in order to control for motor performance.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Three summary scores are provided: i) Unadjusted score: time taken (in seconds) for the search task divided by the number of spaceship pairs correctly circled ii) Motor score: time in seconds for the motor task divided by number of correct pairs iii) The adjusted score is calculated by subtracting the motor score from the unadjusted score, thus controlling for motor speed iv) A normative score is also available, however the ALSPAC codebook recommends this is used with caution, as the original sample used to create the normative scores was small (N = ~100)
Item-level	f8at003 – f8at061

ALSPAC Focus at 8 (age 8.5; 1999-2001): TEA-Ch Sky Search	
variable(s):	
Total score/derived variable(s):	• f8at061 • f8at062 • f8at065 (Explore these variables in Discovery: ALSPAC Focus at 8 Clinic Dataset)
Descriptives:	Unadjusted score: N = 7,249 Range = 1.94 - 48.33 Mean = 6.58 SD = 2.07  Motor score: N = 7,219 Range = 0.35 - 7 Mean = 1.37 SD =0.46  Adjusted score: N = 7,184 Range = -4.05 – 46.58 Mean = 5.20 SD = 1.92

ALSPAC Focus at 8 (age 8.5; 1999-2001): TEA-Ch Sky Search	
	
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89 - 127
Other sweep and/or cohort:	• ALSPAC Age 11
Source:	• Robertson, I. H., Ward, T., Ridgeway, V., & Nimmo-Smith, I. (1996). The structure of normal human attention: The Test of Everyday Attention. Journal of the International Neuropsychological Society, 2(6), 525-534. • Manly, T., Anderson, V., Nimmo-Smith, I., Turner, A., Watson, P., & Robertson, I. H. (2001). The differential assessment of children's attention: The Test of Everyday Attention for Children (TEA-Ch), normative sample and ADHD performance. The Journal of Child Psychology and Psychiatry and Allied Disciplines, 42(8), 1065-1081.
Technical resources:	Heaton, S. C., Reader, S. K., Preston, A. S., Fennell, E. B., Puyana, O. E., Gill, N., & Johnson, J. H. (2001). The Test of Everyday Attention for Children (TEA-Ch): Patterns of performance in children with ADHD and clinical controls. Child Neuropsychology, 7(4), 251-264. https://doi.org/10.1076/chin.7.4.251.8736
Example articles:	• Chandramouli, L., Steer, C. D., Ellis, M., & Emond, A. M. (2009). Effects of early childhood lead exposure on academic performance and behaviour of school age children. Archives of Disease in Childhood. • Odd, D. E., Emond, A., & Whitelaw, A. (2012). Long-term cognitive outcomes of infants born moderately and late preterm. Developmental Medicine & Child Neurology, 54(8), 704- 709.

6.6.14 TEA-Ch: Dividing Attention (Dual Task)

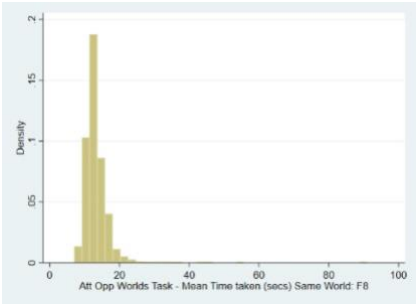
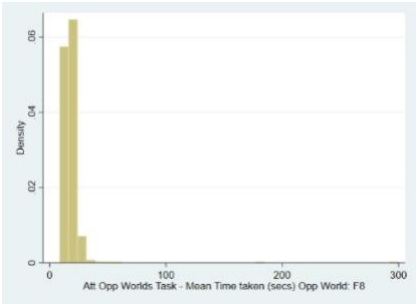
ALSPAC Focus at 8 (age 8.5; 1999-2001): TEA-Ch Dividing Attention (Dual Task)	
Domain:	Memory/Attention
Measures:	Attention/concentration Mental speed Visual scanning Selective attention Working Memory Auditory processing
CHC:	Gsm (Short-Term Memory) Gs (Processing Speed) Gps (Psychomotor Speed) Gv (Visual Processing) Ga (Auditory Processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	The previous selective attention task was repeated, however this time, a number of computer spaceship noises (which varied in length) played throughout the task, and the child was asked to count these noises. This task was also preceded by a practice attempt. The following three aspects of the test were recorded: i) time taken to complete, ii) number of errors, iii) number of spaceship noises correctly counted.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	The overall score was calculated by dividing the time taken to complete the task by the number ofcorrectly identified spaceships circled, and then dividing again by the number of spaceship noises correctly counted. A decrement score (f8at147) was also calculated by subtracting the selective attention task score prior to the adjustment for motor performance (f8at060) from the overall dual task score (f8at146), and this variable (f8at147) is recommended for use for researchers who are not overly familiar with the task.
Item-level	f8at100 – f8at160

ALSPAC Focus at 8 (age 8.5; 1999-2001): TEA-Ch Dividing Attention (Dual Task)	
variable(s):	
Total score/derived variable(s):	f8at148 (Explore these variables in Discovery: ALSPAC Focus at 8 Clinic Dataset)
Descriptives:	N = 7,224 Range = -34.09 - 270.88 Mean = 5.47 SD = 15.94 
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89-127
Other sweep and/or cohort:	• ALSPAC Age 11
Source:	• Robertson, I. H., Ward, T., Ridgeway, V., & Nimmo-Smith, I. (1996). The structure of normal human attention: The Test of Everyday Attention. Journal of the International Neuropsychological Society, 2(6), 525-534. • Manly, T., Anderson, V., Nimmo-Smith, I., Turner, A., Watson, P., & Robertson, I. H. (2001). The differential assessment of children's attention: The Test of Everyday Attention for Children (TEA-Ch), normative sample and ADHD performance. The Journal of Child Psychology and Psychiatry and Allied Disciplines, 42(8), 1065-1081.
Technical resources:	Heaton, S. C., Reader, S. K., Preston, A. S., Fennell, E. B., Puyana, O. E., Gill, N., & Johnson, J. H. (2001). The Test of Everyday Attention for Children (TEA-Ch): Patterns of performance in children with ADHD and clinical controls. Child Neuropsychology, 7(4), 251-264. https://doi.org/10.1076/chin.7.4.251.8736
Example articles:	• Chandramouli, L., Steer, C. D., Ellis, M., & Emond, A. M. (2009). Effects of early childhood lead exposure on academic

ALSPAC Focus at 8 (age 8.5; 1999-2001): TEA-Ch Dividing Attention (Dual Task)	
	performance and behaviour of school age children. Archives of Disease in Childhood. • Odd, D. E., Emond, A., & Whitelaw, A. (2012). Long-term cognitive outcomes of infants born moderately and late preterm. Developmental Medicine & Child Neurology, 54(8), 704- 709.

6.6.15 TEA-Ch: Attention Control (Opposite Worlds)

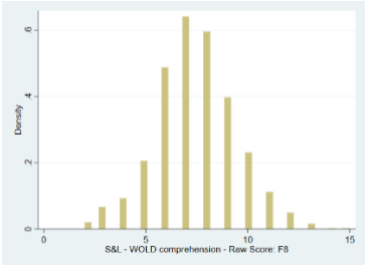
ALSPAC Focus at 8 (age 8.5; 1999-2001): TEA-Ch Attentional Control (Opposite Worlds)	
Domain:	Processing speed
Measures:	Selective attention Cognitive flexibility Processing speed Executive functions
CHC:	Gs (Processing Speed) Gsm (Short-Term Memory)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers
Procedure:	A form of Stroop task. The child was shown a trail made up of the numbers 1 and 2 (with 24 numbers in total). The tester pointed to each number, one after the other, and the child delivered responses based on two conditions. In the 'same world' (control) condition, they read the numbers out as they were, as quickly as possible. In the 'opposite world' condition, the child had to say the opposite number to the one that was pointed to. A demonstration of each condition and a practice attempt at were administered first. There were four test trials: a same world trial, followed by two opposite world trials and finishing with another same world trial.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Mean times for both same world and opposite world trials were calculated. A normative score is also available, however the ALSPAC codebook recommends this is used with caution, as the

ALSPAC Focus at 8 (age 8.5; 1999-2001): TEA-Ch Attentional Control (Opposite Worlds)	
	original sample used to create the normative scores was small (N = approx. 100).
Item-level variable(s):	f8at200 – f8at230
Total score/derived variable(s):	f8at228 f8at229 (Explore these variables in Discovery: ALSPAC Focus at 8 Clinic Dataset)
Descriptives:	Same world: N = 7,208 Range = 7-91 Mean = 13.11 SD = 3.05  Opposite world: N = 7,202 Range = 8.5-300 Mean = 17.46 SD = 5.65 
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89-127
Other sweep and/or cohort:	• ALSPAC Age 11
Source:	• Robertson, I. H., Ward, T., Ridgeway, V., & Nimmo-Smith, I.

ALSPAC Focus at 8 (age 8.5; 1999-2001): TEA-Ch Attentional Control (Opposite Worlds)	
	(1996). The structure of normal human attention: The Test of Everyday Attention. Journal of the International Neuropsychological Society, 2(6), 525-534. • Manly, T., Anderson, V., Nimmo-Smith, I., Turner, A., Watson, P., & Robertson, I. H. (2001). The differential assessment of children's attention: The Test of Everyday Attention for Children (TEA-Ch), normative sample and ADHD performance. The Journal of Child Psychology and Psychiatry and Allied Disciplines, 42(8), 1065-1081.
Technical resources:	Heaton, S. C., Reader, S. K., Preston, A. S., Fennell, E. B., Puyana, O. E., Gill, N., & Johnson, J. H. (2001). The Test of Everyday Attention for Children (TEA-Ch): Patterns of performance in children with ADHD and clinical controls. Child Neuropsychology, 7(4), 251-264.
Example articles:	• Chandramouli, L., Steer, C. D., Ellis, M., & Emond, A. M. (2009). Effects of early childhood lead exposure on academic performance and behaviour of school age children. Archives of Disease in Childhood. • Odd, D. E., Emond, A., & Whitelaw, A. (2012). Long-term cognitive outcomes of infants born moderately and late preterm. Developmental Medicine & Child Neurology, 54(8), 704- 709.

6.6.16 Wechsler Objective Language Dimensions (WOLD): Listening Comprehension

ALSPAC Focus at 8 (age 8.5; 1999-2001): WOLD Listening Comprehension	
Domain:	Verbal comprehension
Measures:	Listening comprehension
CHC:	Gc (Crystallised intelligence) Glr (Long-Term Storage and Retrieval)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers
Procedure:	This task consisted of the second part of the listening

ALSPAC Focus at 8 (age 8.5; 1999-2001): WOLD Listening Comprehension	
	comprehension subtest of the Wechsler Objective Language Dimensions (WOLD, Rust 1996). The tester read aloud a paragraph about a picture, and then the child was asked several questions about what they had heard. For example (taken from ALSPAC clinic documentation): "*Listen carefully. The kitten climbed up into the very highest branches of the tree. Amy called to the kitten to come down, but the kitten did not move. Amy started to climb the tree to get the kitten. "No, Amy," her grandfather said. "You don't need to climb up there. Your kitten will come down when it's ready." Why did Amy want to climb the tree? What reason did Amy's grandfather give her for not climbing the tree?*" The task was discontinued if the child got three consecutive answers wrong. Alternate items from the standard test were used, and items that were judged to be loaded towards American culture were not used.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	A raw score was calculated as the number of items the child got correct.
Item-level variable(s):	f8sl020 – f8sl036
Total score/derived variable(s):	f8sl040 (Explore these variables in Discovery: ALSPAC Focus at 8 Clinic Dataset)
Descriptives:	N = 7,377 Range = 2-15 Mean = 7.46 SD = 1.95 
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89-127

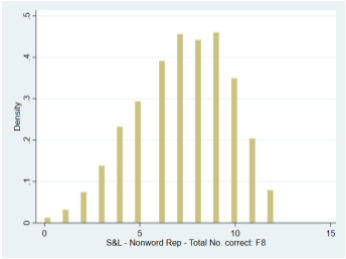
ALSPAC Focus at 8 (age 8.5; 1999-2001): WOLD Listening Comprehension	
Other sweep and/or cohort:	None
Source:	Rust, J. (1996). The manual of the Wechsler objective language dimensions (WOLD) UK Edition. London: The Psychological Corporation.
Technical resources:	None
Example articles:	Hameed, M. A., Lewis, A. J., Sullivan, S., & Zammit, S. (2013). Child literacy and psychotic experiences in early adolescence: findings from the ALSPAC study. Schizophrenia research, 145(1- 3), 88-94. Paget, A., Parker, C., Heron, J., Logan, S., Henley, W., Emond, A., & Ford, T. (2018). Which children and young people are excluded from school? Findings from a large British birth cohort study, the Avon Longitudinal Study of Parents and Children (ALSPAC). Child: Care, Health and Development, 44(2), 285-296.

6.6.17 WOLD: Oral Expression

ALSPAC Focus at 8 (age 8.5; 1999-2001): WOLD Oral Expression	
Domain:	Verbal expression
Measures:	Use of non-imitative expressive language Descriptive skills Narrative skills Sequencing skills
CHC:	Gc (Crystallised intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers
Procedure:	The WOLD has two subtests that measure expressive language, both of which were administered at age 8. In the first test, the child was shown a series of pictures and asked to describe them, with responses coded correct or incorrect. The second part of the subtest consisted of three tasks: i) The child was presented with a picture of a scene, and asked to describe the scene to someone who has not and cannot see the picture.

ALSPAC Focus at 8 (age 8.5; 1999-2001): WOLD Oral Expression	
	ii) The child was shown a map, and asked to give directions (shortest route possible) from one location to another iii) They were tasked with explaining the process of putting batteries into a torch using a series of picture-based instructions.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Responses were taped and coded for relevance, accuracy and logic (currently ongoing; only responses to the first sub-test are currently available).
Item-level variable(s):	f8sl050 – f8sl076 (Explore these variables in Discovery: ALSPAC Focus at 8 Clinic Dataset)
Total score/derived variable(s):	None
Descriptives:	Not available at time of writing.
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89-127
Other sweep and/or cohort:	None
Source:	Rust, J. (1996). The manual of the Wechsler objective language dimensions (WOLD) UK Edition. London: The Psychological Corporation.
Technical resources:	None
Example articles:	• Taylor, A. E., Guthrie, P. A., Smith, G. D., Golding, J., Sattar, N., Hingorani, A. D., ... & Day, I. N. (2011). IQ, educational attainment, memory and plasma lipids: associations with apolipoprotein E genotype in 5995 children. Biological psychiatry, 70(2), 152-158. • Hameed, M. A., Lewis, A. J., Sullivan, S., & Zammit, S. (2013). Child literacy and psychotic experiences in early adolescence: findings from the ALSPAC study. Schizophrenia research, 145(1- 3), 88-94.

6.6.18 Nonword Repetition (short-term memory)

ALSPAC Focus at 8 (age 8.5; 1999-2001): Nonword Repetition (Short term memory)	
Domain:	Verbal repetition
Measures:	Phonetic Coding
CHC:	Gsm (Short term memory) Ga (Auditory processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers
Procedure:	The child was presented with 12 nonsense words, four each containing 3, 4 and 5 syllables. The words were played on a cassette recorder, and the child was asked to repeat each word after it was played.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	The number of correctly repeated items was scored for each child (0 - 12).
Item-level variable(s):	f8sl080 – f8sl105
Total score/derived variable(s):	f8sl105 (Explore these variables in Discovery: ALSPAC Focus at 8 Clinic Dataset)
Descriptives:	N = 7,361 Range = 0 - 12 Mean = 7.23 SD = 2.51 
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89-127
Other sweep and/or cohort:	• ALSPAC Age 5

ALSPAC Focus at 8 (age 8.5; 1999-2001): Nonword Repetition (Short term memory)	
Source:	Gathercole, S. E., & Baddeley, A. D. (1996). The children's test of nonword repetition. Pearson.
Technical resources:	None
Example articles:	• Gathercole, S. E., Briscoe, J., Thorn, A., Tiffany, C., & ALSPAC Study Team. (2008). Deficits in verbal long-term memory and learning in children with poor phonological short-term memory skills. The Quarterly Journal of Experimental Psychology, 61(3), 474-490. • Kormos, J., & Sáfár, A. (2008). Phonological short-term memory, working memory and foreign language performance in intensive language learning. Bilingualism: Language and cognition, 11(2), 261-271.

6.6.19 Articulatory Skills

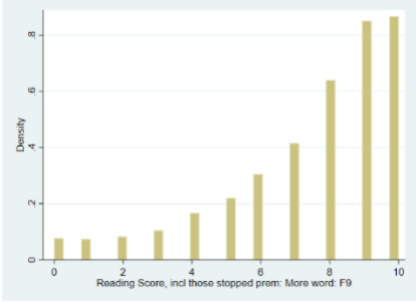
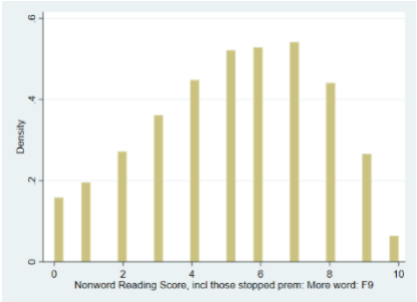
ALSPAC Focus at 8 (age 8.5; 1999-2001): Articulatory Skills	
Domain:	Verbal (articulation)
Measures:	Diadochokinetic (DDK) rates
CHC:	Ga (Auditory Processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers
Procedure:	This test involves the rapid repetition of sounds (syllables) within a given timeframe. The tester demonstrated by repeating a sound, syllable or series of syllables as quickly as possible for a short time. The child was then asked to repeat a series of sounds over a period of at least 10 seconds.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Number of correct repetitions within the time frame. Errors also recorded.
	f8sl120 – f8sl170 (Explore these variables in Discovery: ALSPAC Focus at 8 Clinic Dataset)
Total	None

ALSPAC Focus at 8 (age 8.5; 1999-2001): Articulatory Skills	
score/derived variable(s):	
Descriptives:	N/A (for frequencies see ALSPAC documentation).
Age of participants (months):	Mean = 103.82 months, SD = 3.92, Range = 89-127
Other sweep and/or cohort:	None
Source:	Task designed specifically for study.
Technical resources:	None
Example articles:	• Sullivan, S., Rai, D., Golding, J., Zammit, S., & Steer, C. (2013). The association between autism spectrum disorder and psychotic experiences in the Avon longitudinal study of parents and children (ALSPAC) birth cohort. Journal of the American Academy of Child & Adolescent Psychiatry, 52(8), 806- 814.

6.7 ALSPAC Focus at 9 (age 9 years; 2001-2003)

6.7.1 Word and Non-Word Reading

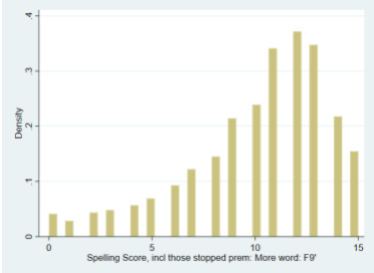
ALSPAC Focus at 9 (age 9; 2001-2003): Word and Non-word Reading	
Domain:	Reading ability
Measures:	Verbal expression Lexical knowledge Pronunciation
CHC:	Gc (Crystallised Intelligence) Grw (Reading/Writing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers
Procedure:	This test consisted of 10 real words, and 10 nonwords. The words were presented to the child in a booklet and the child was asked to read aloud each word.
Link to	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-

ALSPAC Focus at 9 (age 9; 2001-2003): Word and Non-word Reading	
questionnaire:	measures/
Scoring:	Number of correct words (0 - 10 real words; 0 - 10 nonwords).
Item-level variable(s):	f9mw020 – f9mw073
Total score/derived variable(s):	• f9mw031 • f9mw032 • f9mw061 • f9mw062 (Explore these variables in Discovery: ALSPAC Focus at 9 Clinic Dataset)
Descriptives:	Verbal: N = 7,650 Range = 0 - 10 Mean = 7.49 SD = 2.49  Non-verbal: N = 7,637 Range = 0 - 10 Mean = 5.20 SD = 2.50 
Age of participants (months):	Mean = 118.49 months, SD = 3.89, Range = 105-140
Other sweep	None

ALSPAC Focus at 9 (age 9; 2001-2003): Word and Non-word Reading	
and/or cohort:	
Source:	Nunes, T., Bryant, P., & Olsson, J. (2003). Learning morphological and phonological spelling rules: An intervention study. Scientific Studies of Reading, 7(3), 289-307.
Technical resources:	None
Example articles:	• Bath, S. C., Steer, C. D., Golding, J., Emmett, P., & Rayman, M. P. (2013). Effect of inadequate iodine status in UK pregnant women on cognitive outcomes in their children: results from the Avon Longitudinal Study of Parents and Children (ALSPAC). The Lancet, 382(9889), 331-337. • Hameed, M. A., Lewis, A. J., Sullivan, S., & Zammit, S. (2013). Child literacy and psychotic experiences in early adolescence: findings from the ALSPAC study. Schizophrenia Research, 145(1- 3), 88-94.

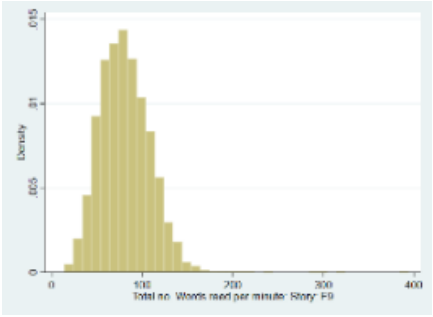
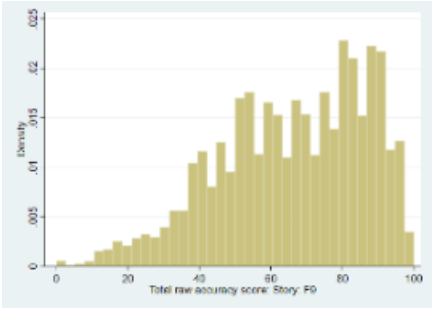
6.7.2 Spelling Task

ALSPAC Focus at 9 (age 9; 2001-2003): Spelling Task	
Domain:	Verbal (spelling)
Measures:	Spelling ability
CHC:	Gc (Crystallised Intelligence) Grw (Reading/Writing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	Based on a pilot study of several hundred children (Peter Bryant and Terezinha Nunes, Personal Communication). The interviewer asked the child to spell 15 words, both regular and irregular, that increased in difficulty. For each word, the interviewer i) read it aloud, and ii) used it in a sentence. The child was asked to write down the correct spelling of the word. The main score was calculated by summing the correct number of items.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Number of correctly spelt words (0 - 15)

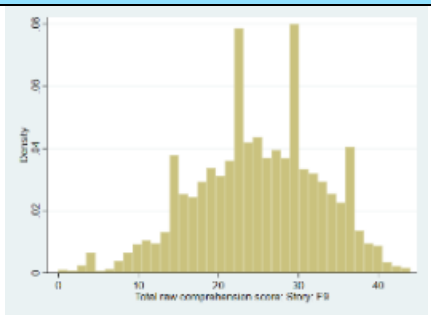
ALSPAC Focus at 9 (age 9; 2001-2003): Spelling Task	
Item-level variable(s):	f9mw080 – f9mw103
Total score/derived variable(s):	• f9mw097 • f9mw098 (Explore these variables in Discovery: ALSPAC Focus at 9 Clinic Dataset)
Descriptives:	N = 7,633 Range = 0 - 15 Mean = 10.19 SD = 3.49 
Age of participants (months):	Mean = 118.49 months, SD = 3.89, Range = 105 - 140
Other sweep and/or cohort:	• ALSPAC age 7
Source:	(Peter Bryant and Terezinha Nunes, Personal Communication)
Technical resources:	None
Example articles:	• Hibbeln, J., Gregory, S., Iles-Caven, Y., Taylor, C. M., Emond, A., & Golding, J. (2018). Total mercury exposure in early pregnancy has no adverse association with scholastic ability of the offspring particularly if the mother eats fish. Environment International, 116, 108-115. • Khandaker, G. M., Stochl, J., Zammit, S., Lewis, G., & Jones, P. B. (2015). A population-based prospective birth cohort study of childhood neurocognitive and psychological functioning in healthy survivors of early life meningitis. Annals of Epidemiology, 25(4), 236-242.

6.7.3 Neale Analysis of Reading Ability (NARA II)

ALSPAC Focus at 9 (age 9; 2001-2003): Neale Analysis of Reading Ability (NARA II)	
Domain:	Verbal (reading ability)
Measures:	Lexical Knowledge Communication Ability Verbal comprehension Verbal expression Reading speed Reading decoding
CHC:	Gc (Crystallized Intelligence) Grw (Reading/Writing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers
Procedure:	The Neale Analysis of Reading Ability (NARA II) was used to assess reading comprehension. The child was presented with a booklet containing short passages of text (accompanied with illustrations). They were asked to read each passage and then asked a series of questions about the story they had just read. The test involved three stories of increasing difficulty (level 1-3). A practice trial was administered first, and if the child made more than 17 errors on the practice passage, they were not asked the comprehension questions and the tester moved straight on to the level one story. All other children moved on to the level two story unless the tester felt that they had particular difficulty with reading the practice passage. If the child made less than three errors on the level two story the tester proceeded to level three. If, however, the child made 3 or more errors on level two, the comprehension questions were administered but the tester moved down to the level one story. For the remaining test passages the child was not asked the comprehension questions if they made more than 16 errors (20 on level six) and the session was ended. The comprehension questions were asked as soon as the child had finished reading. For each question, the child was given 10 to 12 seconds to respond.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/

ALSPAC Focus at 9 (age 9; 2001-2003): Neale Analysis of Reading Ability (NARA II)	
Scoring:	The time taken, number of passages read, number of errors and comprehension scores were recorded. Standardised scores were calculated based on 1546 children (750 boys and 796 girls) in school years 1 to 7 in the UK (Neale, 1997).
Item-level variable(s):	f9sn700 – f9sn707a
Total score/derived variable(s):	f9sn800, f9sn801, f9sn802 (Explore these variables in Discovery: ALSPAC Focus at 9 Clinic Dataset)
Descriptives:	Words per minute (raw): N = 6,918 Range = 14-394 Mean = 80.69 SD = 27.71  Accuracy (raw): N = 6,937 Range = 0 - 100 Mean = 66.03 SD = 20.56  Comprehension (raw): N = 6,937 Range = 0 - 44 Mean = 24.95 SD = 7.84

ALSPAC Focus at 9 (age 9; 2001-2003): Neale Analysis of Reading Ability (NARA II)



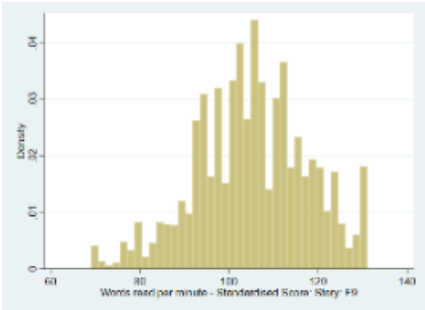
Words per minute (standardised):

N =6,918

Range = 69 - 131

Mean = 105.10

SD = 12.55



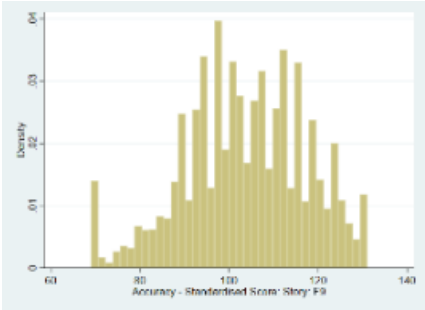
Accuracy (standardised):

N = 6,937

Range = 69 - 131

Mean = 103.64

SD = 13.68



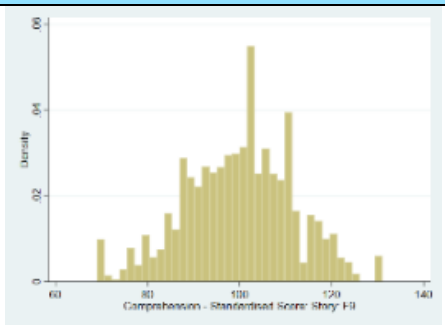
Comprehension (standardised):

N = 6,937

Range = 69 - 131

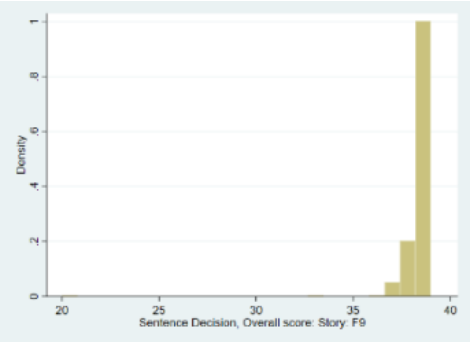
Mean = 99.86

SD = 11.90

ALSPAC Focus at 9 (age 9; 2001-2003): Neale Analysis of Reading Ability (NARA II)	
	
Age of participants (months):	Mean = 118.49 months, SD = 3.89, Range = 105 - 140
Other sweep and/or cohort:	None
Source:	Neale Analysis of Reading Ability-Revised: manual for schools, NFER-Nelson, Windsor, UK (1997)
Technical resources:	None
Example articles:	• Paracchini D Phil, S., Steer, C. D., Buckingham, L. L., Morris, A. P., Ring, S., Scerri D Phil, T., ... & Monaco, A. P. (2008). Association of the KIAA0319 dyslexia susceptibility gene with reading skills in the general population. American Journal of Psychiatry, 165(12), 1576-1584. • Bath, S. C., Steer, C. D., Golding, J., Emmett, P., & Rayman, M. P. (2013). Effect of inadequate iodine status in UK pregnant women on cognitive outcomes in their children: results from the Avon Longitudinal Study of Parents and Children (ALSPAC). The Lancet, 382(9889), 331-337.

6.7.4 Sentence Decision Task

ALSPAC Focus at 9 (age 9; 2001-2003): Sentence Decision Task	
Domain:	Verbal (reading)
Measures:	General (verbal) information comprehension Reading comprehension Reading decoding
CHC:	Gc (Crystallized intelligence) Grw (Reading/Writing)
CLOSER	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12

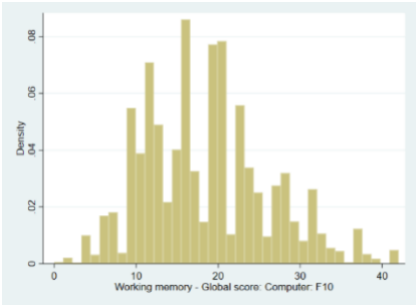
ALSPAC Focus at 9 (age 9; 2001-2003): Sentence Decision Task	
source:	years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	Administered primarily to children who greatly struggled with the NARA II. Children were presented with a series of 39 sentences, some of them describing something that is true (e.g. “Birds have wings”) and some of them describing things that are false (e.g. “Birds wear shoes”). The child was asked to read the sentence and indicate with a tick or a cross if they felt that the sentence was true or false. The child was shown two examples that had already been completed and was then given a further four as practice trials.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Total number of correct responses (0 - 39).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	• f9sd060 • f9sd072 (Explore these variables in Discovery: ALSPAC Focus at 9 Clinic Dataset)
Descriptives:	N = 600 Range = 20 - 39 Mean = 38.71 SD = 0.95 
Age of participants (months):	Mean = 118.49 months, SD = 3.89, Range = 105-140
Other sweep and/or cohort:	None
Source:	Designed specifically for study.

ALSPAC Focus at 9 (age 9; 2001-2003): Sentence Decision Task	
Technical resources:	None
Example articles:	Unknown

6.8 ALSPAC Focus 10+ (age 10 years; 2002-2003)

6.8.1 Working Memory (Counting Span Task)

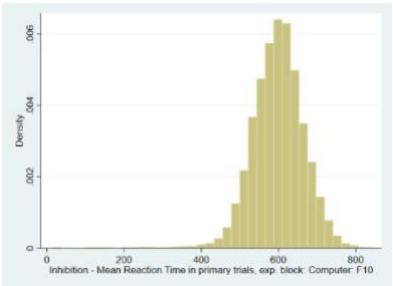
ALSPAC Focus 10+ (age 10; 2002-2003): Working Memory (Counting Span Task)	
Domain:	Short-term visual memory
Measures:	Working memory Simultaneous processing Visual memory
CHC:	Gsm (Short-Term Memory) Gv (Visual Processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; computer-assisted personal interview (CAPI)
Procedure:	This test consisted of two components: the processing component, and the storage component. For the processing component, the child was presented with a number of red and blue dots on a white screen on the computer monitor. The child was asked to point to and count aloud the number of red dots. The child was shown: i) two practice sets of two screens, ii) three sets of two screens, iii) three sets of three screens, iv) three sets of four screens, v) three sets of five screens. For the storage component, the child was asked to recall the number of red dots seen on each screen in the order they were presented within that set after each set. Every child worked through every set regardless of their overall performance.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/

ALSPAC Focus 10+ (age 10; 2002-2003): Working Memory (Counting Span Task)	
Scoring:	The child's working memory calculated (automatically by the computer programme) as the number of correctly recalled sets, weighted by the number of screens within each set, with a max score of 5 (i.e. all correct). Two scores are available: i) A Global score representing the number of trials the child got correct, ii) The Span score, the main outcome measure for this task as described above.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	• fdcm110 • fdcm111 (Explore these variables in Discovery: ALSPAC Focus 10+ Clinic Dataset)
Descriptives:	Global score: N = 7,007 Range = 0 - 42 Mean = 18.52 SD = 7.62  Span score: N = 7,007 Range = 0 - 5 Mean = 3.41 SD = 0.84 

ALSPAC Focus 10+ (age 10; 2002-2003): Working Memory (Counting Span Task)	
Age of participants (months):	Mean = 127.8 months, SD =3.18, Range = 118 - 147
Other sweep and/or cohort:	None
Source:	Case, R., Kurland, D. M., & Goldberg, J. (1982). Operational efficiency and the growth of short-term memory span. Journal of Experimental Child Psychology, 33(3), 386-404.
Technical resources:	None
Example articles:	• Taylor, A. E., Guthrie, P. A., Smith, G. D., Golding, J., Sattar, N., Hingorani, A. D., ... & Day, I. N. (2011). IQ, educational attainment, memory and plasma lipids: associations with apolipoprotein E genotype in 5995 children. Biological Psychiatry, 70(2), 152-158. • Stautz, K., Pechey, R., Couturier, D. L., Deary, I. J., & Marteau, T. M. (2016). Do executive function and impulsivity predict adolescent health behaviour after accounting for intelligence? Findings from the ALSPAC cohort. PloS One, 11(8), e0160512.

6.8.2 Inhibition (Stop Signal Task)

ALSPAC Focus 10+ (age 10; 2002-2003): Inhibition (Stop-Signal Task)	
Domain:	Reaction time
Measures:	Choice reaction time Response inhibition
CHC:	Gt (Decision Speed/Reaction Time)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; computer-assisted personal interview (CAPI)
Procedure:	Sitting in front of the computer monitor, the child was instructed to place their two index fingers in two stimulus boxes, labelled X and O respectively. Two types of trials were performed: primary task trials and stop signal trials. For the primary task, the child was asked to focus on a small smiley face presented in the centre of the computer screen. An X or O would then be presented on the

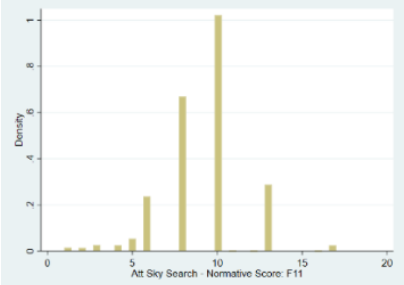
ALSPAC Focus 10+ (age 10; 2002-2003): Inhibition (Stop-Signal Task)	
	screen and the child had to press the corresponding button as fast as possible. Thirty trials were administered (15 X's and 15 O's). A mean reaction time was calculated (this is used to calculate a tone delay used in subsequent trials; see below). The stop signal task was identical to the primary task except that a bleep (stop signal) was heard randomly after the X or O appeared (the go signal). If the bleep was not heard the child was asked to press the corresponding button according to what was presented on screen. When the bleep was sounded the child was told to refrain from pressing the response button, therefore inhibiting the stimulus response. The bleep sounded on random trials at 150 ms or 250 ms before the child's reaction time (as calculated in the Primary Task Trials). A total of 24 practice trials were administered, followed by 48 experimental trials (32 of which were without bleeps and 16 trails were with bleeps). For those children that were deaf or had severe hearing difficulties, a visual stop signal was used instead. For those children who could only use one hand, a one-handed stimulus box was used.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Mean reaction times across different conditions.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	fdcm210 – fdcm222 (Explore these variables in Discovery: ALSPAC Focus 10+ Clinic Dataset)
Descriptives:	N = 6,970 Range = 15.36 - 851.23 Mean = 598.52 SD = 67.59 
Age of	Mean = 127.8 months, SD =3.18, Range = 118-147

ALSPAC Focus 10+ (age 10; 2002-2003): Inhibition (Stop-Signal Task)	
participants (months):	
Other sweep and/or cohort:	• ALSPAC Age 15
Source:	Logan, G. D., Cowan, W. B., & Davis, K. A. (1984). On the ability to inhibit simple and choice reaction time responses: a model and a method. Journal of Experimental Psychology: Human Perception and Performance, 10(2), 276.
Technical resources:	None
Example articles:	• Pindus, D. M., Davis, R. D. M., Hillman, C. H., Bandelow, S., Hogervorst, E., Biddle, S. J., & Sherar, L. B. (2015). The relationship of moderate-to-vigorous physical activity to cognitive processing in adolescents: findings from the ALSPAC birth cohort. Psychological Research, 79(5), 715-728. • Wallace, S., & Linscott, R. J. (2018). Intra-individual variability and psychotic-like experiences in adolescents: Findings from the ALSPAC cohort. Schizophrenia Research, 195, 154-159.

6.9 ALSPAC Focus 11+ (age 11 years; 2003-2005)

6.9.1 Test of Everyday Attention for Children (TEA-Ch): Sky Search

ALSPAC Focus 11+ (age 11.5; 2003-2005): TEA-Ch Sky Search	
Domain:	Attention
Measures:	Selective attention Concentration Mental speed Visual scanning
CHC:	Gs (Processing Speed) Gps (Psychomotor Speed) Gv (Visual Processing) Gsm (Short-Term Memory)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper

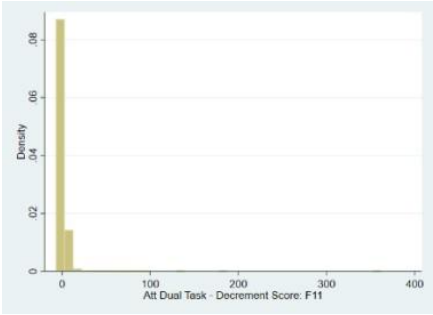
ALSPAC Focus 11+ (age 11.5; 2003-2005): TEA-Ch Sky Search	
Procedure:	The child was presented with an array of non-identical and identical spaceships and was tasked with circling pairs of identical spaceships as quickly as possible, whilst trying to avoid any errors. The interviewer demonstrated, and the child worked through a practice sheet. After the practice sheet, the child was presented with larger sheet and asked to do the same (20 identical pairs). The amount of time taken was recorded in seconds. The above task was repeated, without the non-identical pairs of ships. The aim was to identify how quickly the child could complete the task, in order to control for motor performance.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Three summary scores are provided: i) Unadjusted score: time taken (in seconds) for the search task divided by the number of spaceship pairs correctly circled ii) Motor score: time in seconds for the motor task divided by number of correct pairs iii) The adjusted score is calculated by subtracting the motor score from the unadjusted score, thus controlling for motor speed
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	feat025 – feat065 (Explore these variables in Discovery: ALSPAC Focus 11+ Clinic Dataset)
Descriptives:	N = 7,119 Range = 1-17 Mean = 9.11 SD = 2.42 
Age of	Mean (months) = 140.97, SD = 2.86, Range = 125-163

ALSPAC Focus 11+ (age 11.5; 2003-2005): TEA-Ch Sky Search	
participants (months):	
Other sweep and/or cohort:	• ALSPAC Age 8
Source:	• Robertson, I. H., Ward, T., Ridgeway, V., & Nimmo-Smith, I. (1996). The structure of normal human attention: The Test of Everyday Attention. Journal of the International Neuropsychological Society, 2(6), 525-534. • Manly, T., Anderson, V., Nimmo-Smith, I., Turner, A., Watson, P., & Robertson, I. H. (2001). The differential assessment of children's attention: The Test of Everyday Attention for Children (TEA-Ch), normative sample and ADHD performance. The Journal of Child Psychology and Psychiatry and Allied Disciplines, 42(8), 1065-1081.
Technical resources:	Heaton, S. C., Reader, S. K., Preston, A. S., Fennell, E. B., Puyana, O. E., Gill, N., & Johnson, J. H. (2001). The Test of Everyday Attention for Children (TEA-Ch): Patterns of performance in children with ADHD and clinical controls. Child Neuropsychology, 7(4), 251-264.
Example articles:	• Odd, D. E., Emond, A., & Whitelaw, A. (2012). Long-term cognitive outcomes of infants born moderately and late preterm. Developmental Medicine & Child Neurology, 54(8), 704-709. • Booth, J. N., Tomporowski, P. D., Boyle, J. M., Ness, A. R., Joinson, C., Leary, S. D., & Reilly, J. J. (2013). Associations between executive attention and objectively measured physical activity in adolescence: findings from ALSPAC, a UK cohort. Mental Health and Physical Activity, 6(3), 212-219.

6.9.2 TEA-Ch: Dividing Attention (Dual Task)

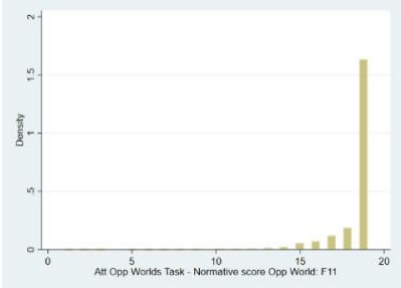
ALSPAC Focus 11+ (age 11.5; 2003-2005): TEA-Ch Dividing Attention (Dual Task)	
Domain:	Memory/Attention
Measures:	Attention/concentration Mental speed Visual scanning Selective attention Working Memory

ALSPAC Focus 11+ (age 11.5; 2003-2005): TEA-Ch Dividing Attention (Dual Task)	
	Auditory processing
CHC:	Gsm (Short-Term Memory) Gs (Processing Speed) Gps (Psychomotor Speed) Gv (Visual Processing) Ga (Auditory Processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	The previous selective attention task was repeated, however this time, a number of computer spaceship noises (which varied in length) played throughout the task, and the child was asked to count these noises. This task was also preceded by a practice attempt. The following three aspects of the test were recorded: i) time taken to complete, ii) number of errors, iii) number of spaceship noises correctly counted.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	The overall score was calculated by dividing the time taken to complete the task by the number of correctly identified spaceships circled, and then dividing again by the number of spaceship noises correctly counted. A decrement score (feat147) was also calculated by subtracting the selective attention task score prior to the adjustment for motor performance (feat060) from the overall dual task score (feat146), and this variable (feat147) is recommended for use for researchers who are not overly familiar with the task.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	feat136 – feat155 (Explore these variables in Discovery: ALSPAC Focus 11+ Clinic Dataset)
Descriptives:	N = 6,988 Range = -7.17 - 362.03 Mean = 1.35

ALSPAC Focus 11+ (age 11.5; 2003-2005): TEA-Ch Dividing Attention (Dual Task)	
	SD = 6.68 
Age of participants (months):	Mean (months) = 140.97, SD = 2.86, Range = 125-163
Other sweep and/or cohort:	• ALSPAC (Age 8)
Source:	• Robertson, I. H., Ward, T., Ridgeway, V., & Nimmo-Smith, I. (1996). The structure of normal human attention: The Test of Everyday Attention. Journal of the International Neuropsychological Society, 2(6), 525-534. • Manly, T., Anderson, V., Nimmo-Smith, I., Turner, A., Watson, P., & Robertson, I. H. (2001). The differential assessment of children's attention: The Test of Everyday Attention for Children (TEA-Ch), normative sample and ADHD performance. The Journal of Child Psychology and Psychiatry and Allied Disciplines, 42(8), 1065-1081.
Technical resources:	Heaton, S. C., Reader, S. K., Preston, A. S., Fennell, E. B., Puyana, O. E., Gill, N., & Johnson, J. H. (2001). The Test of Everyday Attention for Children (TEA-Ch): Patterns of performance in children with ADHD and clinical controls. Child Neuropsychology, 7(4), 251-264.
Example articles:	• Odd, D. E., Emond, A., & Whitelaw, A. (2012). Long-term cognitive outcomes of infants born moderately and late preterm. Developmental Medicine & Child Neurology, 54(8), 704- 709. • Booth, J. N., Tomporowski, P. D., Boyle, J. M., Ness, A. R., Joinson, C., Leary, S. D., & Reilly, J. J. (2013). Associations between executive attention and objectively measured physical activity in adolescence: findings from ALSPAC, a UK cohort. Mental Health and Physical Activity, 6(3), 212-219.

6.9.3 TEA-Ch: Attentional Control (Opposite Worlds)

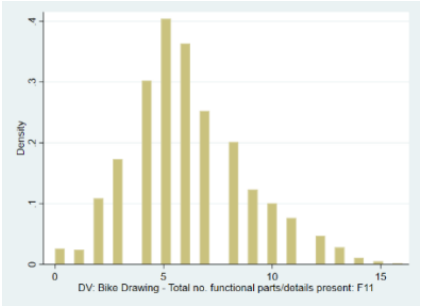
ALSPAC Focus 11+ (age 11.5; 2003-2005): TEA-Ch Attentional Control (Opposite Worlds)	
Domain:	Processing speed
Measures:	Selective attention Cognitive flexibility Processing speed Executive functions
CHC:	Gs (Processing Speed) Gsm (Short-Term Memory)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	A form of Stroop task. The child was shown a trail made up of the numbers 1 and 2 (with 24 numbers in total). The tester pointed to each number, one after the other, and the child delivered responses based on two conditions. In the 'same world' (control) condition, they read the numbers out as they are, as quickly as possible. In the 'opposite world' condition, the child was required to say the opposite number to the one that was pointed to. A demonstration of each condition and a practice attempt were administered first. There were four test trials: a same world trial, followed by two opposite world trials and finishing with another same world trial.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Mean time (seconds)
Item-level variable(s):	Not readily available
Total score/derived variable(s):	feat200 – feat229 (Explore these variables in Discovery: ALSPAC Focus 11+ Clinic Dataset)
Descriptives:	Same world normative score: N = 6,799 Range = 1-19 Mean = 18.81 SD = 0.97

ALSPAC Focus 11+ (age 11.5; 2003-2005): TEA-Ch Attentional Control (Opposite Worlds)	
	 Opposite world normative: N = 6,797 Range = 1-19 Mean = 18.44 SD = 1.36 
Age of participants (months):	Mean (months) = 140.97, SD = 2.86, Range = 125-163
Other sweep and/or cohort:	• ALSPAC (Age 8)
Source:	• Robertson, I. H., Ward, T., Ridgeway, V., & Nimmo-Smith, I. (1996). The structure of normal human attention: The Test of Everyday Attention. Journal of the International Neuropsychological Society, 2(6), 525-534. • Manly, T., Anderson, V., Nimmo-Smith, I., Turner, A., Watson, P., & Robertson, I. H. (2001). The differential assessment of children's attention: The Test of Everyday Attention for Children (TEA-Ch), normative sample and ADHD performance. The Journal of Child Psychology and Psychiatry and Allied Disciplines, 42(8), 1065-1081.
Technical resources:	Heaton, S. C., Reader, S. K., Preston, A. S., Fennell, E. B., Puyana, O. E., Gill, N., & Johnson, J. H. (2001). The Test of Everyday Attention for Children (TEA-Ch): Patterns of performance in children with ADHD and clinical controls. Child Neuropsychology, 7(4), 251-264.
Example	Booth, J. N., Tomporowski, P. D., Boyle, J. M., Ness, A. R., Joinson,

ALSPAC Focus 11+ (age 11.5; 2003-2005): TEA-Ch Attentional Control (Opposite Worlds)	
articles:	C., Leary, S. D., & Reilly, J. J. (2013). Associations between executive attention and objectively measured physical activity in adolescence: findings from ALSPAC, a UK cohort. Mental Health and Physical Activity, 6(3), 212-219.

6.9.4 Higher Conceptual Reasoning (Bike-drawing task)

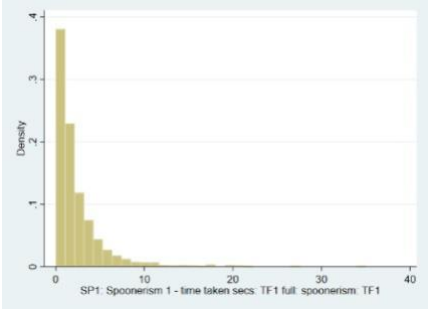
ALSPAC Focus 11+ (age 11.5; 2003-2005): Higher Conceptual Reasoning (Bike-drawing task)	
Domain:	General ability (perceptual)
Measures:	Higher conceptual reasoning Mechanical reasoning Visuographing functioning
CHC:	G (General ability)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	The child was asked to draw a bicycle within a box on a piece of A4 paper. They were given a maximum of 3 minutes to complete the task and were prompted with 30 seconds remaining. They were scored on whether any of 12 basic items necessary for a bike to function were present in the drawing (e.g. wheels, handlebars). A further 10 more detailed items were also scored (e.g. basket, bell), as were 3 possible background aspects of the picture (road, landscape, sky).
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	In the early stages, each criterion was scored present/absent. However, additional coding was required to note whether an item was functional (e.g. pedals attached to frame), and scoring was later amended to Yes, functional; Yes, not functional and No. There is a summary variable that indicates which coding scheme was used. According to the latest ALSPAC documentation, early data is currently being recoded to the new format.
Item-level variable(s):	febd001 – febd101

ALSPAC Focus 11+ (age 11.5; 2003-2005): Higher Conceptual Reasoning (Bike-drawing task)	
Total score/derived variable(s):	febd020a – febd071 (Explore these variables in Discovery: ALSPAC Focus 11+ Clinic Dataset)
Descriptives:	N = 4,296 Range = 0 - 16 Mean = 6.08 SD = 2.70 
Age of participants (months):	Mean (months) = 140.97, SD = 2.86, Range = 125 - 163
Other sweep and/or cohort:	None
Source:	Designed for study by Professor Dieter Wolke. Based on similar tasks that have been used for decades, e.g. Piaget, J. (1930).
Technical resources:	None
Example articles:	Unknown

6.10 ALSPAC Teen Focus 1 (age 12.5 years; 2004)

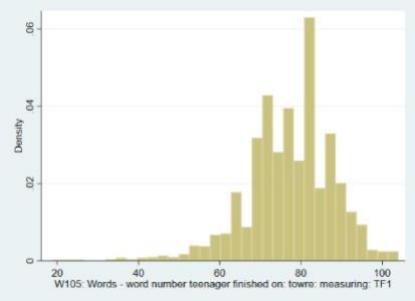
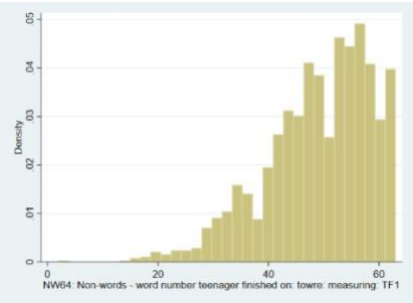
6.10.1 Phonological Awareness (Spoonerisms)

ALSPAC Teen Focus 1 (age 12.5; 2004): Phonological Awareness (Spoonerisms)	
Domain:	Phonological processing
Measures:	Metaphonological skill (phonological awareness)
CHC:	Unknown
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration	Trained interviewer; clinical setting; oral answers

ALSPAC Teen Focus 1 (age 12.5; 2004): Phonological Awareness (Spoonerisms)	
method:	
Procedure:	The child was played a series of two words (e.g. Paddington Bear) and was asked to repeat them, with the first sounds swapped around (e.g. Baddington Pear). Used as a screener for dyslexia.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Response time (seconds) and number of errors are recorded.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	ff4270 – ff8923 (Explore these variables in Discovery: ALSPAC Teen Focus 1/Teen Focus 1 FastTrack Clinic Dataset)
Descriptives:	Time in seconds to complete first trial: N = 1,998 Range = 0 - 35 Mean = 2.71 SD = 2.92 
Age of participants (months):	Mean (months) = 153.73, SD = 2.77, Range = 136 - 171
Other sweep and/or cohort:	None
Source:	Similar to the spoonerism test from the Phonological Assessment Battery (PhAB): Gallagher, A., & Frederickson, N. (1995). The Phonological Assessment Battery (PhAB): An initial assessment of its theoretical and practical utility. *Educational and Child Psychology*, *12*(1), 53-67.
Technical resources:	None
Example articles:	Unknown

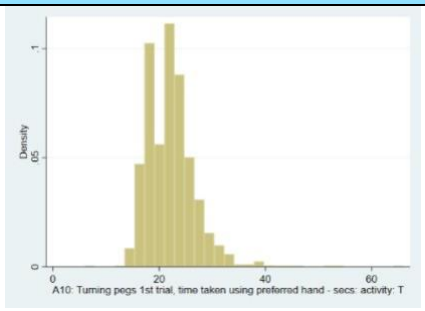
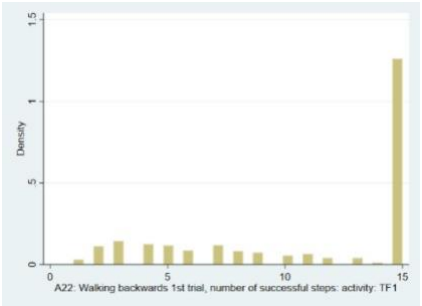
6.10.2 Tests of Reading Efficiency/Fluency (TOWRE)

ALSPAC Teen Focus 1 (age 12.5; 2004): Tests of Reading Efficiency/Fluency (TOWRE)	
Domain:	Reading ability
Measures:	Verbal expression Lexical knowledge Pronunciation Sight word efficiency Decoding efficiency Reading speed
CHC:	Gc (Crystallised Intelligence) Grw (Reading/Writing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers
Procedure:	The child was presented with two lists, one consisting of real words (e.g. she, strong, crowd) and the other nonwords (e.g. ip, nup, poth). The child was asked to read the words aloud as quickly as possible (max time limit of 45 seconds per list).
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Score based on number of correct words within timeframe.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	ff2430 – ff2525 (Explore these variables in Discovery: ALSPAC Teen Focus 1/Teen Focus 1 FastTrack Clinic Dataset)
Descriptives:	Real words reached: N = 2,084 Range = 19-104 Mean = 77.38 SD = 10.60

ALSPAC Teen Focus 1 (age 12.5; 2004): Tests of Reading Efficiency/Fluency (TOWRE)	
	 Non-words reached: N = 2,081 Range = 2-63 Mean = 49.07 SD = 9.63 
Age of participants (months):	Mean (months) = 153.73, SD = 2.77, Range = 136 - 171
Other sweep and/or cohort:	• ALSPAC (Age 13.5 years)
Source:	Torgesen, J. K., Rashotte, C. A., & Wagner, R. K. (1999). TOWRE: Test of word reading efficiency. Austin, TX: Pro-ed.
Technical resources:	None
Example articles:	• Bryant, P., Nunes, T., & Barros, R. (2014). The connection between children's knowledge and use of grapho-phonic and morphemic units in written text and their learning at school. British Journal of Educational Psychology, 84(2), 211-225. • Davis, O. S., Band, G., Pirinen, M., Haworth, C. M., Meaburn, E. L., Kovas, Y., ... & Curtis, C. J. (2014). The correlation between reading and mathematics ability at age twelve has a substantial genetic component. Nature Communications, 5, 4204.

6.10.3 Motor Skill and Movement Test

ALSPAC Teen Focus 1 (age 12.5; 2004): Motor Skill and Movement Test	
Domain:	Motor ability
Measures:	Motor skill Speed of limb movement Limb power Movement time Dexterity
CHC:	Gps (Psychomotor Speed)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Childhood (5 years to 12 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers; physical task
Procedure:	Children undertook five separate physical tasks: 1) Turning Pegs (invert 12 pegs in a peg board) 2) Throwing at target (throws ball at target 3 meters away) 3) Walking backwards (child walks backwards along a 4.5 metre line on the floor) 4) One-hand catch (child bounces ball of wall 2m away and catches with one hand) 5) Two footed jump (child jumps forward as far as possible from a standing position)
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Scored on speed, accuracy and distance.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	ff2640 – ff2893 (Explore these variables in Discovery: ALSPAC Teen Focus 1/Teen Focus 1 FastTrack Clinic Dataset)
Descriptives:	Turning pegs first trial (preferred hand): N = 1,956 Range = 6-66 Mean = 22.03 SD = 4.41

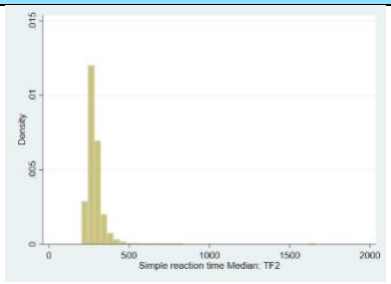
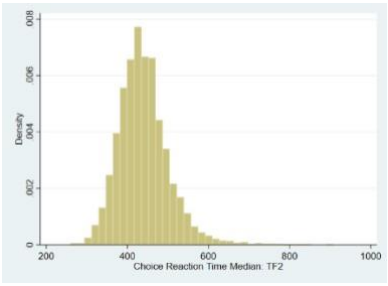
ALSPAC Teen Focus 1 (age 12.5; 2004): Motor Skill and Movement Test	
	 Walking backwards (no. steps): N = 2,081 Range = 1-15 Mean = 10.92 SD = 4.92 
Age of participants (months):	Mean (months) = 153.73, SD = 2.77, Range = 136 - 171
Other sweep and/or cohort:	None
Source:	Devised for study.
Technical resources:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Example articles:	None

6.11 ALSPAC Teen Focus 2 (age 13.5 years; 2005-2006)

6.11.1 Reaction Time (Simple, Choice, Digit Vigilance)

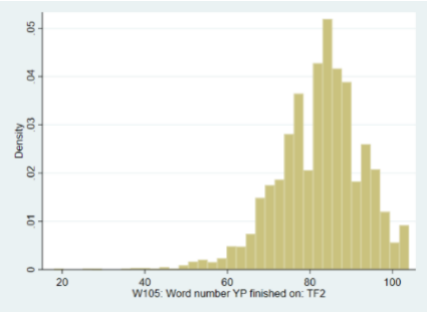
ALSPAC Teen Focus 2 (age 13.5; 2005-2006): Reaction Time (Simple, Choice, Digit Vigilance)	
Domain:	Reaction time
Measures:	Alertness

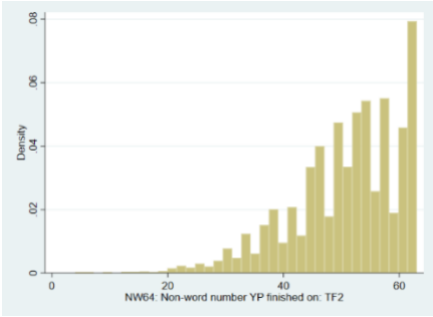
ALSPAC Teen Focus 2 (age 13.5; 2005-2006): Reaction Time (Simple, Choice, Digit Vigilance)	
	Concentration Simple reaction time Choice reaction time Mental Comparison Speed
CHC:	Gt (Decision speed/reaction time)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Adolescence (13 years – 18 years 11 months).
Administration method:	Trained interviewer; clinical setting; computer-assisted personal interview (CAPI)
Procedure:	Reaction time was measured using three different tasks: i) Simple reaction time: Using the CAPI, the child was presented with the word "YES" in the middle of the screen, at irregular intervals. They were instructed to press the left arrow key as soon as they saw the word "YES" appear. ii) Choice Reaction time: Same as above but with the addition of the word "NO". Participant is instructed to press the left arrow key when "YES" appears, and the right arrow key when "NO" appears. iii) Digit Vigilance: A single number is presented on the right hand side of the screen, and a series of changing numbers appear in the centre. When the number in the centre matches the number on the right, the participant must press the left arrow key as quickly as possible.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Speed (median) and errors are recorded.
Item-level variable(s):	None
Total score/derived variable(s):	fg5600 – fg5681 (Explore these variables in Discovery: ALSPAC Teen Focus 2 Clinic Dataset)
Descriptives:	Simple reaction time (median): N = 5,477 Range = 204-1663 Mean = 285.26 SD = 51.49

ALSPAC Teen Focus 2 (age 13.5; 2005-2006): Reaction Time (Simple, Choice, Digit Vigilance)	
	 Choice reaction time (median): N = 5,454 Range = 259-907 Mean = 440.30 SD = 63.02 
Age of participants (months):	Mean (months) = 166.02, SD = 2.49, Range = 150 - 182
Other sweep and/or cohort:	None
Source:	Standard reaction time tasks designed for study.
Technical resources:	None
Example articles:	• Booth, J. N., Tomporowski, P. D., Boyle, J. M., Ness, A. R., Joinson, C., Leary, S. D., & Reilly, J. J. (2013). Associations between executive attention and objectively measured physical activity in adolescence: findings from ALSPAC, a UK cohort. Mental Health and Physical Activity, 6(3), 212-219.

6.11.2 Tests of Reading Efficiency/Fluency (TOWRE)

ALSPAC Teen Focus 2 (age 13.5; 2005-2006): Tests of Reading Efficiency/Fluency (TOWRE)	
Domain:	Reading ability
Measures:	Verbal expression

ALSPAC Teen Focus 2 (age 13.5; 2005-2006): Tests of Reading Efficiency/Fluency (TOWRE)	
	Lexical knowledge Pronunciation Sight word efficiency Decoding efficiency Reading speed
CHC:	Gc (Crystallised Intelligence) Grw (Reading/Writing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Adolescence (13 years – 18 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers
Procedure:	The child was presented with two lists, one consisting of real words (e.g. she, strong, crowd) and the other nonwords (e.g. ip, nup, poth). The child was asked to read the words aloud as quickly as possible (max time limit of 45 seconds per list).
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Score based on number of correct words within timeframe.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	fg5700 – fg5925 (Explore these variables in Discovery: ALSPAC Teen Focus 2 Clinic Dataset)
Descriptives:	Real word finished on: N = 5,535 Range = 18-104 Mean = 82.54 SD = 10.35  Non-word finished on: N = 5,522

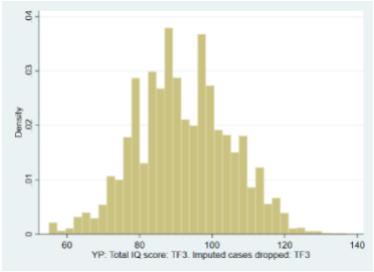
ALSPAC Teen Focus 2 (age 13.5; 2005-2006): Tests of Reading Efficiency/Fluency (TOWRE)	
	Range = 4-63 Mean = 50.80 SD = 9.41 
Age of participants (months):	Mean (months) = 166.02, SD = 2.49, Range = 150 - 182
Other sweep and/or cohort:	• ALSPAC (Age 12.5 years)
Source:	Torgesen, J. K., Rashotte, C. A., & Wagner, R. K. (1999). TOWRE: Test of word reading efficiency. Austin, TX: Pro-ed.
Technical resources:	None
Example articles:	• Bryant, P., Nunes, T., & Barros, R. (2014). The connection between children's knowledge and use of grapho-phonic and morphemic units in written text and their learning at school. British Journal of Educational Psychology, 84(2), 211-225. • Davis, O. S., Band, G., Pirinen, M., Haworth, C. M., Meaburn, E. L., Kovas, Y., ... & Curtis, C. J. (2014). The correlation between reading and mathematics ability at age twelve has a substantial genetic component. Nature Communications, 5, 4204.

6.12 ALSPAC Teen Focus 3 (age 15.5 years; 2006-2008)

6.12.1 Wechsler Abbreviated Scale of Intelligence (WASI)

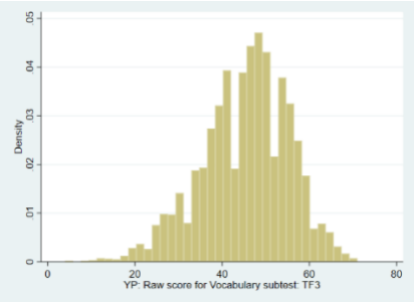
ALSPAC Teen Focus 3 (age 15.5; 2006-2008): Wechsler Abbreviated Scale of Intelligence (WASI)	
Domain:	Verbal and non-verbal ability
Measures:	Verbal Ability

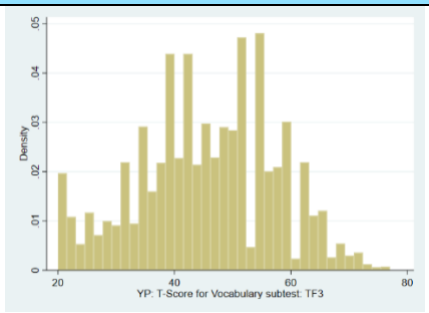
ALSPAC Teen Focus 3 (age 15.5; 2006-2008): Wechsler Abbreviated Scale of Intelligence (WASI)	
	Non-verbal/performance ability
CHC:	G (general ability)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Adolescence (13 years – 18 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers; pen and paper
Procedure:	The WASI is a measure of general cognitive ability designed for use in adults and older adolescents. It is a short-form measure that was developed in tangent with, and designed to provide an estimate of, the full Wechsler Adult Intelligence Scale. It is comprised of four subscales, two verbal and two performance (non-verbal). The two verbal subtests are: i) vocabulary ii) similarities The performance subtests are: i) block design ii) matrix reasoning Each subtest is described individually in the sections below. The WASI provides standard scores (M= 100, SD = 15), on verbal IQ, performance IQ and fullscale IQ. Raw scores are converted into age-adjusted standardized scores using tables provided in the WASI manual. ***Note that only the vocabulary and matrix reasoning tests were administered at this clinic, and these were used to approximate full IQ scores.***
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Standardised score (M= 100, SD = 15)
Item-level variable(s):	fh6272 – fh6276
Total score/derived variable(s):	fh6277 – fh6281 (Explore these variables in Discovery:)
Descriptives:	Fullscale IQ: N = 4,955 Range = 55-137

ALSPAC Teen Focus 3 (age 15.5; 2006-2008): Wechsler Abbreviated Scale of Intelligence (WASI)	
	Mean = 91.96 SD = 13.00 
Age of participants (months):	Mean = 185.69 months, SD = 4.24, Range = 171-212
Other sweep and/or cohort:	None
Source:	Wechsler, D. (1999). Manual for the Wechsler abbreviated intelligence scale (WASI). San Antonio, TX: The Psychological Corporation.
Technical resources:	None
Example articles:	• Smithers, L. G., Golley, R. K., Mittinty, M. N., Brazionis, L., Northstone, K., Emmett, P., & Lynch, J. W. (2013). Do dietary trajectories between infancy and toddlerhood influence IQ in childhood and adolescence? Results from a prospective birth cohort study. PLoS One, 8(3), e58904. • Ramsay, H., Barnett, J. H., Murray, G. K., Miettunen, J., Mäki, P., Järvelin, M. R., ... & Veijola, J. (2018). Cognition, psychosis risk and metabolic measures in two adolescent birth cohorts. Psychological medicine, 48(15), 2609-2623.

6.12.2 WASI Vocabulary

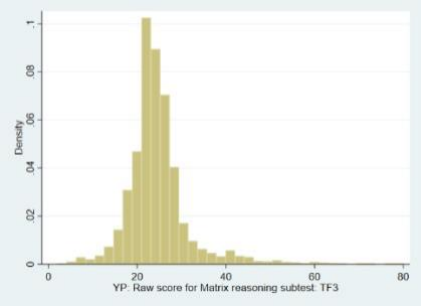
ALSPAC Teen Focus 3 (age 15.5; 2006-2008): WASI Vocabulary	
Domain:	Verbal ability
Measures:	Verbal comprehension Lexical knowledge Long-term memory Language development
CHC:	Gc (Crystallised intelligence)

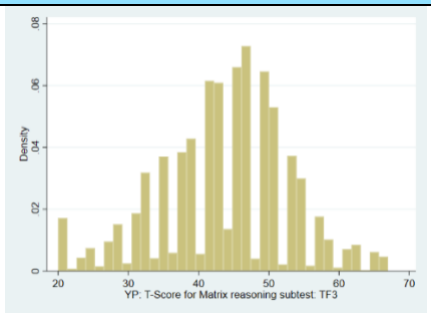
ALSPAC Teen Focus 3 (age 15.5; 2006-2008): WASI Vocabulary	
CLOSER source:	Explore this sweep in Discovery: ALSPAC Adolescence (13 years – 18 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers
Procedure:	The test consists of 42 items. For items 7-10, the interviewer showed the child a picture and asked them to describe what they saw (e.g. a fish). For all other items, the interviewer read aloud a list of words, asking the child to define each one as they proceed, e.g. ("Tell me what TRANSFORM means").
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Items 7-10 were worth 1 point each. All other items are scored on a 0 - 2 scale depending on the quality of response. * note see documentation. WASI scores may underestimate IQ. Raw scores were converted to T-scores using the WASI manual (0 - 60).
Item-level variable(s):	Not readily available
Total score/derived variable(s):	• fh6272 • fh6277 (Explore these variables in Discovery:)
Descriptives:	Raw score: N = 5,281 Range = 4 - 71 Mean = 45.42 SD = 10.02  T-score: N = 5,281 Range = 20 - 77 Mean = 45.56 SD = 11.82

ALSPAC Teen Focus 3 (age 15.5; 2006-2008): WASI Vocabulary	
	
Age of participants (months):	Mean = 185.69 months, SD = 4.24, Range = 171 - 212
Other sweep and/or cohort:	• ALSPAC Age 4
Source:	Wechsler, D. (1999). Manual for the Wechsler abbreviated intelligence scale (WASI). San Antonio, TX: The Psychological Corporation.
Technical resources:	None
Example articles:	• Mokrysz, C., Landy, R., Gage, S. H., Munafò, M. R., Roiser, J. P., & Curran, H. V. (2016). Are IQ and educational outcomes in teenagers related to their cannabis use? A prospective cohort study. Journal of Psychopharmacology, 30(2), 159-168. • Ramsay, H., Barnett, J. H., Murray, G. K., Miettunen, J., Mäki, P., Järvelin, M. R., ... & Veijola, J. (2018). Cognition, psychosis risk and metabolic measures in two adolescent birth cohorts. Psychological medicine, 48(15), 2609-2623.

6.12.3 WASI Matrix Reasoning

ALSPAC Teen Focus 3 (age 15.5; 2006-2008): WASI Matrix Reasoning	
Domain:	Non-verbal ability
Measures:	Classification and spatial ability Knowledge of part-whole relationships Simultaneous processing Perceptual organization
CHC:	Gf (Fluid intelligence) Gv (Visual processing)
CLOSER	Explore this sweep in Discovery: ALSPAC Adolescence (13 years –

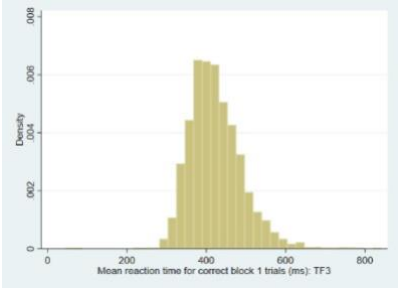
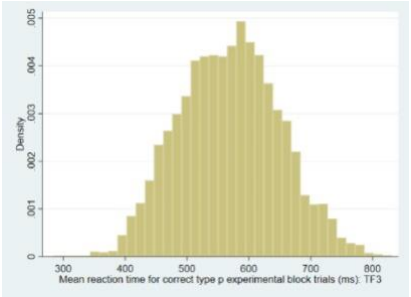
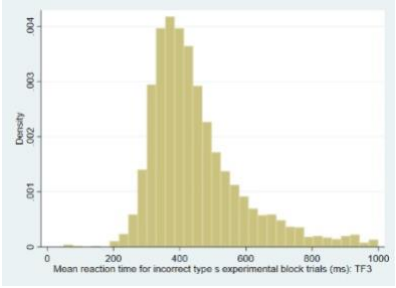
ALSPAC Teen Focus 3 (age 15.5; 2006-2008): WASI Matrix Reasoning	
source:	18 years 11 months).
Administration method:	Trained interviewer; clinical setting; pen and paper
Procedure:	The child was shown an incomplete matrix or visual series and selected the response option (from a possible 5) that completed the matrix or series. Two practice trials were administered followed by 28 real trials.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	A single point was awarded for each correct answer. * note see documentation. WASI scores may underestimate IQ. Raw scores were converted to T-scores using the WASI manual (0 - 60).
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	• fh6275 • fh6278 (Explore these variables in Discovery: ALSPAC Teen Focus 3 Clinic Dataset)
Descriptives:	Raw score: N = 5,277 Range = 2 - 80 Mean = 24.67 SD = 7.17  T-score: N = 4,956 Range = 20 - 67 Mean = 43.68 SD = 9.15

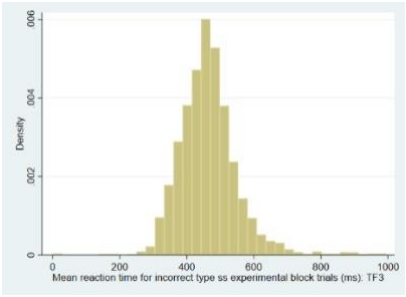
ALSPAC Teen Focus 3 (age 15.5; 2006-2008): WASI Matrix Reasoning	
	
Age of participants (months):	Mean = 185.69 months, SD = 4.24, Range = 171-212
Other sweep and/or cohort:	BCS70 (age 10 and 16)
Source:	Wechsler, D. (1999). Manual for the Wechsler abbreviated intelligence scale (WASI). San Antonio, TX: The Psychological Corporation.
Technical resources:	None
Example articles:	• Smithers, L. G., Golley, R. K., Mittinty, M. N., Brazionis, L., Northstone, K., Emmett, P., & Lynch, J. W. (2013). Do dietary trajectories between infancy and toddlerhood influence IQ in childhood and adolescence? Results from a prospective birth cohort study. PLoS One, 8(3), e58904. • Mokrysz, C., Landy, R., Gage, S. H., Munafò, M. R., Roiser, J. P., & Curran, H. V. (2016). Are IQ and educational outcomes in teenagers related to their cannabis use? A prospective cohort study. Journal of Psychopharmacology, 30(2), 159-168.

6.12.4 Inhibition (Stop-Signal Task)

ALSPAC Teen Focus 3 (age 15.5; 2006-2008): Inhibition (Stop-Signal Task)	
Domain:	Reaction time
Measures:	Choice reaction time Response inhibition
CHC:	Gt (Decision Speed/Reaction Time)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Adolescence (13 years – 18 years 11 months).
Administration	Trained interviewer; clinical setting; computer-assisted personal

ALSPAC Teen Focus 3 (age 15.5; 2006-2008): Inhibition (Stop-Signal Task)	
method:	interview (CAPI)
Procedure:	Sitting in front of the computer monitor, the child was instructed to place their two index fingers in two stimulus boxes, labelled X and O respectively. Two types of trials were performed: primary task trials and stop signal trials. For the primary task, the child was asked to focus on a small smiley face presented in the centre of the computer screen. An X or O would then be presented on the screen and the child had to press the corresponding button as fast as possible. A mean reaction time was calculated (this is used to calculate a tone delay used in subsequent trials; see below). The stop signal task was identical to the primary task except that a bleep (stop signal) was heard randomly after the X or O appears (the go signal). If the bleep was not heard the child was asked to press the corresponding button according to what was presented on screen. When the bleep was sounded the child was told to refrain from pressing the response button, therefore inhibiting the stimulus response. The bleep sounded on random trials at 150 ms or 250 ms before the child's reaction time (as calculated in the Primary Task Trials). For those children that were deaf or had severe hearing difficulties, a visual stop signal was used instead. For those children who could only use one hand, a one-handed stimulus box was used. The young person receives four blocks of trials. The first block consisted of Xs and Os with no beeps (30 trials in total) - the young person practiced the button presses here. The second block consisted of Xs, Os and beeps (24 trials in total 8 of which have a beep) - the young person practiced the button presses with beeps here. The third and fourth blocks were the actual experimental trials. Each experimental block consisted of 48 trials total in each. 32 of those trials were without beeps, and 16 trials were with beeps.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Mean reaction time across different conditions.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	fh6910 – fh6953 (Explore these variables in Discovery: ALSPAC Teen Focus 3 Clinic Dataset)

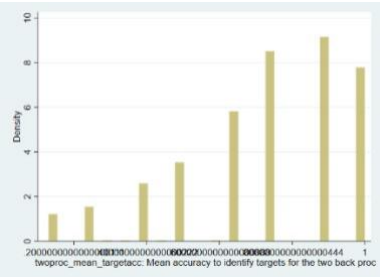
ALSPAC Teen Focus 3 (age 15.5; 2006-2008): Inhibition (Stop-Signal Task)	
Descriptives:	Correct block 1 (mean RT): N = 5,252 Range = 45-841 Mean = 423.78 SD = 66.95  Correct type p (mean RT): N = 5,252 Range = 284-831 Mean = 568.78 SD = 81.40  Incorrect type s (mean RT): N = 2,734 Range = 49 - 999 Mean = 448.55 SD = 139.25  Incorrect type ss (mean RT): N = 4,344 Range = 1-995

ALSPAC Teen Focus 3 (age 15.5; 2006-2008): Inhibition (Stop-Signal Task)	
	Mean = 464.52 SD = 87.95 
Age of participants (months):	Mean = 185.69 months, SD = 4.24, Range = 171-212
Other sweep and/or cohort:	ALSPAC Age 10
Source:	Logan, G. D., Cowan, W. B., & Davis, K. A. (1984). On the ability to inhibit simple and choice reaction time responses: a model and a method. Journal of Experimental Psychology: Human Perception and Performance, 10(2), 276.
Technical resources:	None
Example articles:	Pindus, D. M., Davis, R. D. M., Hillman, C. H., Bandelow, S., Hogervorst, E., Biddle, S. J., & Sherar, L. B. (2015). The relationship of moderate-to-vigorous physical activity to cognitive processing in adolescents: findings from the ALSPAC birth cohort. Psychological Research, 79(5), 715-728. Wallace, S., & Linscott, R. J. (2018). Intra-individual variability and psychotic-like experiences in adolescents: Findings from the ALSPAC cohort. Schizophrenia Research, 195, 154-159.

6.13 ALSPAC Teen Focus 4, Focus at 17 (age 17.5 years; 2008-2011)

6.13.1 N-Back Task (working memory)

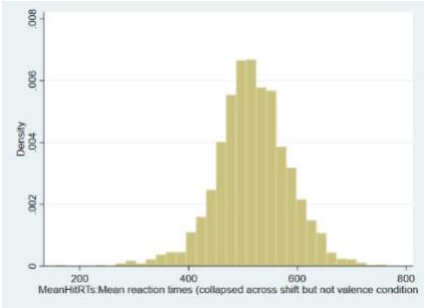
ALSPAC Teen Focus 4, Focus at 17 (age 17.5; 2008-2011): N-Back Task (Working Memory)	
Domain:	Non-verbal memory
Measures:	Working memory Executive function

ALSPAC Teen Focus 4, Focus at 17 (age 17.5; 2008-2011): N-Back Task (Working Memory)	
CHC:	Gsm (Short-Term Memory)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Adolescence (13 years – 18 years 11 months).
Administration method:	Trained interviewer; clinical setting; computer-assisted personal interview (CAPI)
Procedure:	In the N-Back task, participants were presented with a sequence of stimuli one-by-one. They had to decide whether the current stimulus was the same as the one presented N trials ago. In this case, N was either 1, 2, or 3 trials. The higher the number, the more difficult the task. Visuospatial stimuli (letters and numbers) were used in the trials.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Mean accuracy and median reaction time.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	FJNB001 – FJNB1000 (Explore these variables in Discovery: ALSPAC teen Focus 4 Clinic Dataset)
Descriptives:	Mean accuracy to identify non-targets (2-back condition): N = 3,595 Range = 0.13-1 Mean = 0.72 SD = 0.23 
Age of participants (months):	Mean = 213.59 months, SD = 5.46, Range = 195-240
Other sweep and/or cohort:	None
Source:	Kirchner, W. K. (1958). Age differences in short-term retention of rapidly changing information. Journal of Experimental

ALSPAC Teen Focus 4, Focus at 17 (age 17.5; 2008-2011): N-Back Task (Working Memory)	
	Psychology, 55(4), 352.
Technical resources:	None
Example articles:	• Wardle, M. C., De Wit, H., Penton-Voak, I., Lewis, G., & Munafo, • M. R. (2013). Lack of association between COMT and working memory in a population-based cohort of healthy young adults. Neuropsychopharmacology, 38(7), 1253. • Sinclair, L. I., Button, K. S., Munafò, M. R., Day, I. N., & Lewis, G. (2015). Possible association of APOE genotype with working memory in young adults. PloS one, 10(8), e0135894.

6.13.2 Information processing biases (Affective Go/No-Go Task)

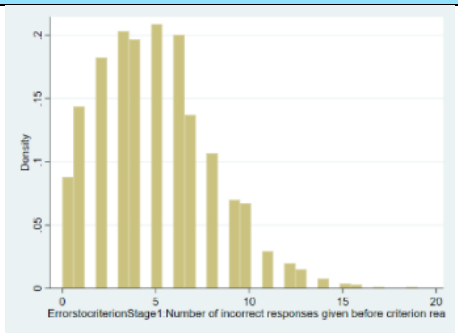
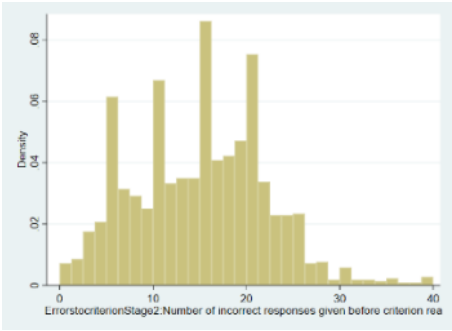
ALSPAC Teen Focus 4, Focus at 17 (age 17.5; 2008-2011): Information Processing Biases (Affective Go/No-Go Task)	
Domain:	Information processing biases for positive and negative stimuli
Measures:	Executive control of positive and negative information
CHC:	None
CLOSER source:	Explore this sweep in Discovery: ALSPAC Adolescence (13 years – 18 years 11 months).
Administration method:	Trained interviewer; clinical setting; computer-assisted personal interview (CAPI)
Procedure:	This test required participants to differentiate between happy and sad words. Eight blocks of 18 words pertaining to emotions were presented. Single words appeared on the computer screen, and participants were instructed to hit the spacebar when a happy word appeared (e.g. hopeful, serene). After two word blocks requiring responses to happy words, the instructions changed so that the space bar was to be pressed for sad words. Instructions were alternated in this fashion until all eight blocks were administered. Words were presented for 300 msec, with a 900 msec interval between each word.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Mean RTs (reaction times) for hits (i.e., pressing the space bar in the presence of a target word), collapsed across valence and shift condition.

ALSPAC Teen Focus 4, Focus at 17 (age 17.5; 2008-2011): Information Processing Biases (Affective Go/No-Go Task)	
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	FJGO001 – FJGO1850 (Explore these variables in Discovery: ALSPAC teen Focus 4 Clinic Dataset)
Descriptives:	N = 2,485 Range = 155.38 - 764.07 Mean = 517.38 SD = 66.94 
Age of participants (months):	Mean = 213.59 months, SD = 5.46, Range = 195-240
Other sweep and/or cohort:	None
Source:	Murphy, F. C., Sahakian, B. J., Rubinsztein, J. S., Michael, A., Rogers, R. D., Robbins, T. W., & Paykel, E. S. (1999). Emotional bias and inhibitory control processes in mania and depression. Psychological medicine, 29(6), 1307-1321.
Technical resources:	None
Example articles:	Unknown

6.13.3 Behavioural inhibition (Probability Learning and Reversal Task)

ALSPAC Teen Focus 4, Focus at 17 (age 17.5; 2008-2011): Behavioural inhibition (Probability Learning and Reversal Task)	
Domain:	Memory
Measures:	Executive function
CHC:	Gsm (Short-term memory)

ALSPAC Teen Focus 4, Focus at 17 (age 17.5; 2008-2011): Behavioural inhibition (Probability Learning and Reversal Task)	
CLOSER source:	Explore this sweep in Discovery: ALSPAC Adolescence (13 years – 18 years 11 months).
Administration method:	Trained interviewer; clinical setting; computer-assisted personal interview (CAPI)
Procedure:	The participant had to learn a 'rule' (i.e. a red and a green 'grating' pattern) that determined which of two abstract stimuli were selected. The rule changed in the middle of the block, and the goal was to see how quickly the participant could adapt to the rule change. All participants completed 40 trials of the initial rule, before the rule was reversed and a further 40 trials were administered.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Number of correct responses per condition.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	• FJPR001 • FJPR050 • FJPR100 • FJPR150 • FJPR200 • FJPR250 • FJPR300 • FJPR350 • FJPR400 • FJPR450 • FJPR500 • FJPR550 • FJPR600 • FJPR650 (Explore these variables in Discovery: ALSPAC teen Focus 4 Clinic Dataset)
Descriptives:	Number of incorrect responses (Stage 1): N = 1,782 Range = 0 - 19 Mean = 4.90 SD = 3.11

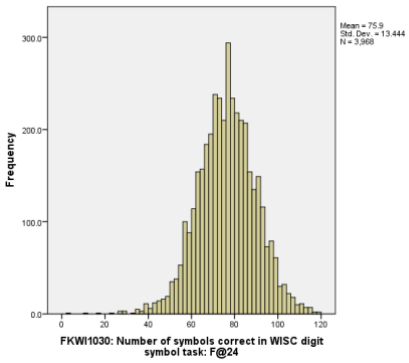
ALSPAC Teen Focus 4, Focus at 17 (age 17.5; 2008-2011): Behavioural inhibition (Probability Learning and Reversal Task)	
	 Number of incorrect responses (Stage 2): N = 1,782 Range = 0 - 40 Mean = 14.88 SD = 7.06 
Age of participants (months):	Mean = 213.59 months, SD = 5.46, Range = 195-240
Other sweep and/or cohort:	None
Source:	Lawrence, A. D., Sahakian, B. J., Rogers, R. D., Hodges, J. R., & Robbins, T. W. (1999). Discrimination, reversal, and shift learning in Huntington's disease: mechanisms of impaired response selection. Neuropsychologia, 37(12), 1359-1374.
Technical resources:	None
Example articles:	• Lancaster, T. M., Dimitriadis, S. L., Tansey, K. E., Perry, G., Ihssen, N., Jones, D. K., ... & Zammit, S. (2018). Structural and Functional Neuroimaging of Polygenic Risk for Schizophrenia: A Recall-by-Genotype-Based Approach. Schizophrenia Bulletin, 45(2), 405-414. • Ramsay, H., Barnett, J. H., Murray, G. K., Miettunen, J., Mäki, P., Järvelin, M. R., ... & Veijola, J. (2018). Cognition, psychosis

ALSPAC Teen Focus 4, Focus at 17 (age 17.5; 2008-2011): Behavioural inhibition (Probability Learning and Reversal Task)	
	risk and metabolic measures in two adolescent birth cohorts. Psychological Medicine, 48(15), 2609-2623.

6.14 ALSPAC Focus at 24 (age 24 years; 2015-2017)

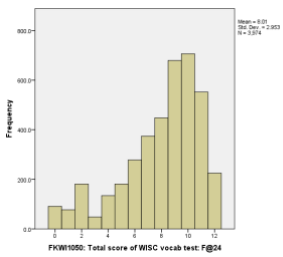
6.14.1 Wechsler Intelligence Scale for Children (WISC-III) Digit Symbol Coding

ALSPAC Focus at 24 (age 24; 2015-2017): WAIS-III Digit Symbol Coding	
Domain:	Non-verbal memory and processing speed
Measures:	Visual perception Short-term memory Motor coordination
CHC:	Gs (processing speed) Gv (visual processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months).
Administration method:	Trained interviewer; face to face; clinical setting; pen and paper task
Procedure:	Participants were presented with a series of numbers that were each associated with unique symbols. They were then presented with a list of numbers and asked to copy the matching symbols as quickly as possible. A practice trial was administered, and the real test lasted for 120 seconds. Although the WISC-II tasks were developed for children, the digit symbol coding task was deemed still appropriate to use because it does not have a ceiling effect and it was important to use the same tests across the data collection waves in order to track change in cognitive ability over time.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point was awarded for each correctly copied symbol within the allotted time.
Item-level variable(s):	Not readily available.
Total	• FKWI1030 (number of symbols correct)

ALSPAC Focus at 24 (age 24; 2015-2017): WAIS-III Digit Symbol Coding	
score/derived variable(s):	• FKWI1031 (number of errors)
Descriptives:	FKWI1030 (number of symbols correct): N = 3,968 Range = 2 - 120 Mean = 75.9 SD = 13.444 
Age of participants (months):	Mean = 293.81 months, SD = 9.779, Range = 268.5 – 318.5
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 2; Age 50) • ALSPAC (Focus on Mothers clinic 3; Age 52) • ALSPAC (Focus on Mothers clinic 4; Age 53)
Source:	Wechsler, D. (1998). WAIS-III UK administration and scoring manual. London, UK: The Psychological Corporation
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

6.14.2 WISC-III Vocabulary Task

ALSPAC Focus at 24 (age 24; 2015-2017): WISC-III Vocabulary Task	
Domain:	Verbal ability
Measures:	Verbal comprehension Lexical knowledge Long-term memory

ALSPAC Focus at 24 (age 24; 2015-2017): WISC-III Vocabulary Task	
	Language development
CHC:	Gc (Crystallised intelligence)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months).
Administration method:	Trained interviewer; clinical setting; oral answers
Procedure:	The interviewer read aloud a list of words, asking the participant to define each one in turn. Responses were scored on a 0 - 2 scale depending on the quality of response. Although the WISC-II tasks were developed for children, the vocabulary task was deemed still appropriate to use because the words used for the test were based on previously collected ALSPAC data and it was important to use the same tests across the data collection waves in order to track change in cognitive ability over time.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Responses were scored on a 0 - 2 scale depending on the quality of response.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	FKWI1050
Descriptives:	N = 3974 Mean = 8.01 SD = 2.953 Range = 0 – 12 
Age of participants	Mean = 293.81 months, SD = 9.779, Range = 268.5 – 318.5

ALSPAC Focus at 24 (age 24; 2015-2017): WISC-III Vocabulary Task	
(months):	
Other sweep and/or cohort:	• ALSPAC Age 8 • NSHD Age 8 and 11 (similar tests) • BCS70 Age 10 (similar British Abilities Scale task)
Source:	Wechsler, D. (1991). WISC-III: Wechsler intelligence scale for children: Manual. Psychological Corporation.
Technical resources:	Kaufman, A. S., & Lichtenberger, E. O. (2000). Essentials of WISC-III and WPPSI-R assessment. John Wiley & Sons Inc.
Example articles:	• Horwood, J., Salvi, G., Thomas, K., Duffy, L., Gunnell, D., Hollis, C., ... & Zammit, S. (2008). IQ and non-clinical psychotic symptoms in 12-year-olds: results from the ALSPAC birth cohort. The British Journal of Psychiatry, 193(3), 185-191. • Northstone, K., Joinson, C., Emmett, P., Ness, A., & Paus, T. (2012). Are dietary patterns in childhood associated with IQ at 8 years of age? A population-based cohort study. Journal of Epidemiology and Community Health, 66(7), 624-628.

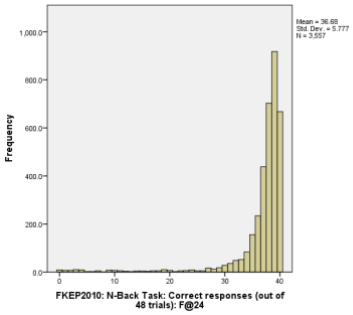
6.14.3 Inhibition (Stop-Signal Task)

ALSPAC Focus at 24 (age 24; 2015-2017): Inhibition (Stop-Signal Task)	
Domain:	Reaction time
Measures:	Choice reaction time Response inhibition
CHC:	Gt (Decision Speed/Reaction Time
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months).
Administration method:	Trained interviewer; clinical setting; computer-assisted personal interview (CAPI)
Procedure:	This task was the first element of the Eprime cognitive tasks session. In the first part of the task the participant fixated on a plus sign (+) presented in the centre of the computer screen. An 'X' or 'O' was then presented on the screen and the correct key (the left or right arrow key) pressed as quickly as possible. These trials familiarised the participant with the task. The second part was identical to the first, but a bleep was heard (the stop signal) randomly after the X or O appeared (the go signal) on 25% of trials. If the bleep was not heard the participant was asked to press the

ALSPAC Focus at 24 (age 24; 2015-2017): Inhibition (Stop-Signal Task)	
	corresponding key according to what was presented on screen. When the bleep was sounded the participant was to refrain from pressing the response button.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Mean reaction times across different conditions.
Item-level variable(s):	• FKEP3010 (Go accuracy) • FKEP3020 (Stop accuracy) • FKEP3030 (median Go signal reaction time) • FKEP3040 (median failed Stop signal reaction time) • FKEP3050 (est. delay when prob. of correctly stopping is 50%) FKEP3060 (Stop signal reaction time)
Total score/derived variable(s):	N/A (only item-level variables)
Descriptives:	N = 3,432 (for all item-level variables)
Age of participants (months):	Mean = 293.81 months, SD = 9.779, Range = 268.5 – 318.5
Other sweep and/or cohort:	• ALSPAC Age 10 • ALSPAC Age 15
Source:	Logan, G. D., Cowan, W. B., & Davis, K. A. (1984). On the ability to inhibit simple and choice reaction time responses: a model and a method. Journal of Experimental Psychology: Human Perception and Performance, 10(2), 276.
Technical resources:	None
Example articles:	• Pindus, D. M., Davis, R. D. M., Hillman, C. H., Bandelow, S., Hogervorst, E., Biddle, S. J., & Sherar, L. B. (2015). The relationship of moderate-to-vigorous physical activity to cognitive processing in adolescents: findings from the ALSPAC birth cohort. Psychological Research, 79(5), 715-728. • Wallace, S., & Linscott, R. J. (2018). Intra-individual variability and psychotic-like experiences in adolescents: Findings from the ALSPAC cohort. Schizophrenia Research, 195, 154-159.

6.14.4 N-Back Task (working memory)

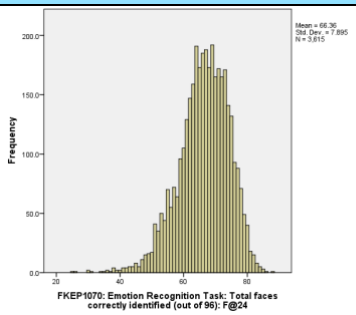
ALSPAC Focus at 24 (age 24; 2015-2017): N-Back Task (Working Memory)	
Domain:	Non-verbal memory
Measures:	Working memory Executive function
CHC:	Gsm (Short-Term Memory)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months).
Administration method:	Trained interviewer; clinical setting; computer-assisted personal interview (CAPI)
Procedure:	This task was the third element of the Eprime cognitive testing session. In the task, participants were presented with a sequence of stimuli one-by-one. They had to decide whether the current stimulus was the same as the one presented N trials ago. In this case, N was 2 trials. The higher the number, the more difficult the task. Visuospatial stimuli (letters and numbers) were used in the trials. In each trial, participants could either provide a correct response, give a false alarm (i.e. erroneously report that the stimulus appeared N trials ago), or not respond (i.e. fail to report that the stimulus appeared N trials ago). In 8 of the 48 trials, the stimulus had appeared N trials ago; if the participant correctly reported this, their response was scored as a hit, and if they failed to report it, their answer was scored as a miss.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Mean accuracy and median reaction time.
Item-level variable(s):	• FKEP2010 (correct responses) • FKEP2020 (false alarms) • FKEP2030 (hits) • FKEP2040 (missed) • FKEP2050 (no response)
Total score/derived variable(s):	FKEP2010 (number of correct responses)
Descriptives:	FKEP2010 (no. of correct responses): N = 3,557

ALSPAC Focus at 24 (age 24; 2015-2017): N-Back Task (Working Memory)	
	Range = 0 – 40 Mean = 36.68 SD = 5.777 
Age of participants (months):	Mean = 293.81 months, SD = 9.779, Range = 268.5 – 318.5
Other sweep and/or cohort:	• ALSPAC Age 17
Source:	Kirchner, W. K. (1958). Age differences in short-term retention of rapidly changing information. Journal of Experimental Psychology, 55(4), 352.
Technical resources:	None
Example articles:	• Wardle, M. C., De Wit, H., Penton-Voak, I., Lewis, G., & Munafo, M. R. (2013). Lack of association between COMT and working memory in a population-based cohort of healthy young adults. Neuropsychopharmacology, 38(7), 1253. • Sinclair, L. I., Button, K. S., Munafò, M. R., Day, I. N., & Lewis, G. (2015). Possible association of APOE genotype with working memory in young adults. PloS one, 10(8), e0135894.

6.14.5 Emotion Recognition Task

ALSPAC Focus at 24 (age 24; 2015-2017): Emotion Recognition Task	
Domain:	Social cognition
Measures:	Nonverbal social information processing Nonverbal receiving ability Nonverbal sending accuracy
CHC:	Gkn (General domain-specific knowledge)
CLOSER	Explore this sweep in Discovery: ALSPAC Early Adulthood (19

ALSPAC Focus at 24 (age 24; 2015-2017): Emotion Recognition Task	
source:	years – 30 years 11 months).
Administration method:	Trained interviewer; clinical setting; computer-assisted personal interview (CAPI)
Procedure:	This task was the second element of the Eprime cognitive testing session. In the task, facial images showing a specific emotion were displayed on the screen one at a time. Each face was displayed for 200ms and then immediately covered up; the participant was required to select which emotion the face displayed from 6 options. Emotion intensity was varied across 8 stimuli within each emotion. Each individual stimulus was presented twice, giving 96 trials in total.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point awarded for each correct answer (0 – 96).
Item-level variable(s):	• FKEP1010 (Angry false alarms) • FKEP1015 (Angry faces identified correctly) • FKEP1020 (Disgust false alarms) • FKEP1025 (Disgust faces identified correctly) • FKEP1030 (Fear false alarms) • FKEP1035 (Fear faces identified correctly) • FKEP1040 (Happy false alarms) • FKEP1045 (Happy faces identified correctly) • FKEP1050 (Sad false alarms) • FKEP1055 (Sad faces identified correctly) • FKEP1060 (Surprise false alarms) • FKEP1065 (Surprise faces identified correctly)
Total score/derived variable(s):	FKEP1070 (total faces identified correctly)
Descriptives:	N = 3,615 Range = 24 – 88 Mean = 66.36 SD = 7.895

ALSPAC Focus at 24 (age 24; 2015-2017): Emotion Recognition Task	
	
Age of participants (months):	Mean = 293.81 months, SD = 9.779, Range = 268.5 – 318.5
Other sweep and/or cohort:	• Similar test in ALSPAC, Focus at 8 (DANVA: Faces subtest)
Source:	Penton-Voak I. S., Bate H., Lewis G., & Munafò M. R. (2012). Effects of emotion perception training on mood in undergraduate students: Randomised controlled trial. The British Journal of Psychiatry, (1), 71–72.
Technical resources:	None
Example articles:	• Saylik, R., Raman, E., & Szameitat, A.J. (2018). Sex Differences in Emotion Recognition and Working Memory Tasks. Frontiers in Psychology, 9, 1072.

6.14.6 Source Monitoring Task

ALSPAC Focus at 24 (age 24; 2015-2017): Source Monitoring Task	
Domain:	Verbal (memory)
Measures:	Attribution errors
CHC:	Glr (Long-term storage & retrieval)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months).
Administration method:	Clinical setting; trained interviewer.
Procedure:	During the first source monitoring session, participants were shown a list of cards with categories on (e.g. musical instruments), after which the fieldworker verbally gave the participant an example of this category (e.g. a guitar) and showed them an image

ALSPAC Focus at 24 (age 24; 2015-2017): Source Monitoring Task	
	of the same category (e.g. an image of a piano). Participants were then asked to provide a third example of this category, different from the two provided by the fieldworker, which was noted by the fieldworker. During the second source monitoring session the fieldworker read out a list of items to the participant, some of which were provided earlier (either by the fieldworker or by the participant), while others were not. For each item, participants were asked whether that item was mentioned in the first session, and if so, whether the response was given verbally by the fieldworker, given in an image by the fieldworker, or said by the participant.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Number of old items correctly reported as old, new items correctly reported as new, new items incorrectly reported as old, and old items incorrectly reported as new.
Item-level variable(s):	FKSO1011 – FKSO1106
Total score/derived variable(s):	• FKSO1001 (number of items correctly remembered as old) • FKSO1002 (number of items correctly remembered as said by self) • FKSO1003 (number of items incorrectly remembered as old) • FKSO1004 (number of items incorrectly remembered as said by self)
Descriptives:	N = 3,678
Age of participants (months):	Mean = 293.81 months, SD = 9.779, Range = 268.5 – 318.5
Other sweep and/or cohort:	None
Source:	Brébion, G., Amador, X., David, A., Malaspina, D., Sharif, Z., & Gorman, J. M. (2000). Positive symptomatology and source-monitoring failure in schizophrenia—an analysis of symptom-specific effects. Psychiatry research, 95(2), 119-131.
Technical resources:	None
Example	Unknown

ALSPAC Focus at 24 (age 24; 2015-2017): Source Monitoring Task	
articles:	

6.14.7 Jumping to Conclusions Task ("Beads Task")

ALSPAC Focus at 24 (age 24; 2015-2017): Jumping to Conclusions Task ("Beads Task")	
Domain:	Verbal and non-verbal ability
Measures:	Executive function (decision making) Data gathering Cognitive biases in delusions
CHC:	N/A
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months).
Administration method:	Computer-Assisted Personal interview (CAPI)
Procedure:	The Jumping to Conclusions task (also known as the "Beads task") was a computer-based task which required participants to guess which of two jars a red or blue bead has been drawn from. In each jar there were 100 beads: in the Red jar, there were 80 red beads, and 20 blue beads, in the Blue jar, there were 80 blue beads, and 20 red beads. In the first Jumping to Conclusions task – the Draws to Decision (DTD) task – participants were shown one bead, which was then put back in the jar. Participants could ask to see more beads drawn from the same jar (up to 10 in total) and had to decide which jar the beads were coming from once they were sure about their decision. This task was repeated five times, with the jar for each trial chosen at random. In the second Jumping to Conclusions task – the Probability Estimation (ProbEst) task – participants were again shown a bead from a jar, which would vary over the course of the task, and asked to rate how sure they were of which jar the beads are coming from. The sliding scale had five broad categories of 'Red sure', 'Red quite sure', 'Not sure', 'Blue quite sure', and 'Blue sure'. In total, 30 beads were displayed for this second task.

ALSPAC Focus at 24 (age 24; 2015-2017): Jumping to Conclusions Task ("Beads Task")	
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	None available
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	• FKJU1000 • FKJU1005 • FKJU1010 – FKJU1017 • FKJU1020 • FKJU1025 • FKJU1050 – FKJU1058 • FKJU1060 – FKJU1067 • FKJU1070 – FKJU1075
Descriptives:	N = 3,525
Age of participants (months):	Mean = 293.81 months, SD = 9.779, Range = 268.5 – 318.5
Other sweep and/or cohort:	None
Source:	Garety, P. A., Freeman, D., Jolley, S., Dunn, G., Bebbington, P. E., Fowler, D. G., ... & Dudley, R. (2005). Reasoning, emotions, and delusional conviction in psychosis. Journal of abnormal psychology, 114(3), 373.
Technical resources:	None
Example articles:	So, S,H., Freeman, D., Dunn, G., Kapur, S., Kuipers, E., Bebbington, P., Fowler, D., & Garety, P.A. (2012). Jumping to Conclusions, a Lack of Belief Flexibility and Delusional Conviction in Psychosis. Journal of Abnormal Psychology, 121(1), 129–139.

6.14.8 Predictive Processing Task

ALSPAC Focus at 24 (age 24; 2015-2017): Predictive Processing Task	
Domain:	Verbal and non-verbal ability
Measures:	Information processing
CHC:	N/A

ALSPAC Focus at 24 (age 24; 2015-2017): Predictive Processing Task	
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Computer-Assisted Personal Interview (CAPI)
Procedure:	The Predictive Processing task is a computer-assisted task scheduled to last 20 minutes that participants completed on their own in the computer room. Beforehand, a fieldworker explained the task and the participant was then able to practice the task before completing the actual task on their own. The task involved participants viewing two-tone black and white images and was split into three blocks. In the first 'before' block, participants were presented with a series of 10 two-tone black-and-white images and were asked whether they could see an animal/person in the image. They were then presented with the same two-tone image but with a red dot on it and asked whether the red dot was in the background or was on the person/animal. In the second 'template' block, individuals were presented with colour photos of the images from the 'before' block. Finally, in the third 'after' block, participants were again presented with the two-tone black-and-white images, and asked whether, after seeing the colour version of the image, an animal/person was in the image and whether a red dot was on the animal/person or in the background.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	None available
Item-level variable(s):	Not readily available
Total score/derived variable(s):	FKPP1000 – FKPP1350
Descriptives:	N = 3,654
Age of participants (months):	Mean = 293.81 months, SD = 9.779, Range = 268.5 – 318.5
Other sweep and/or cohort:	None

ALSPAC Focus at 24 (age 24; 2015-2017): Predictive Processing Task	
Source:	Teufel, C., Subramaniam, N., Dobler, V., Perez, J., Finnemann, J., Mehta, P. R., ... & Fletcher, P. C. (2015). Shift toward prior knowledge confers a perceptual advantage in early psychosis and psychosis-prone healthy individuals. Proceedings of the National Academy of Sciences, 112(43), 13401-13406.
Technical resources:	Kingdom, F., & Prins, N. (2009). Psychophysics: A Practical Introduction. Amsterdam: Elsevier. Macmillan, N. A., & Creelman, C. D. (2005). Detection theory: a user's guide (2nd ed.). Mahwah, New Jersey: Lawrence Erbaum Associates.
Example articles:	Unknown

6.15 ALSPAC Focus on Mothers 2 (FOM2; 2011-2013)

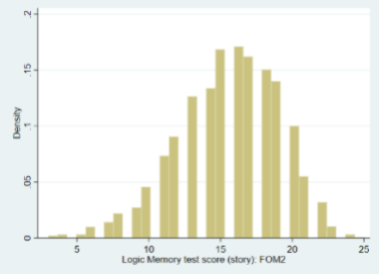
A study of ALSPAC study mothers began in 2008 with the aim of determining what factors are related to body size, bone density, blood pressure, glucose, insulin and abnormal blood lipids in women. This "Focus on Mothers" study consisted of four clinics held during the following periods: i) 2008 - 2011, ii) 2011 - 2013, iii) 2013 - 2014, and iv) 2014 - 2015.

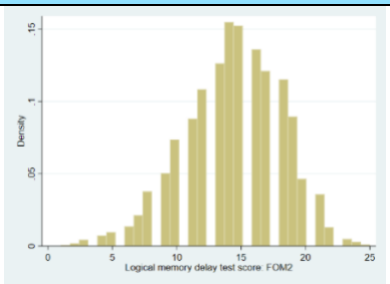
Each clinic lasted approximately 2.5 hours. For further details see (Fraser et al., 2013).

Along with various physical measures, measures of cognitive ability/functioning were collected at clinics FOM2, FOM3, and FOM4.

6.15.1 Logic Memory (Immediate and Delayed)

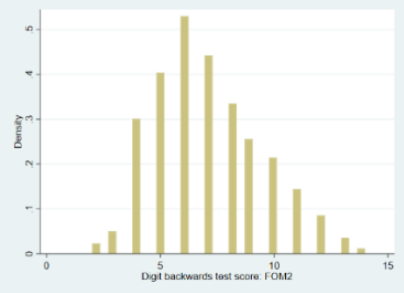
ALSPAC Focus on Mothers 2 (2011-2013): Logic memory (immediate and delayed)	
Domain:	Verbal memory
Measures:	Attention Short-term episodic memory Verbal memory
CHC:	Glr (long-term storage and retrieval)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting
Procedure:	Participants were played an audio recording of a short story, and

ALSPAC Focus on Mothers 2 (2011-2013): Logic memory (immediate and delayed)	
	were asked to recount the story, using as close to the original wording as possible. They were given one minute to recount as much information as they could remember, with occasional prompts of encouragement (e.g. 'Anything else?') from the tester. After completing all other cognitive assessments, participants were again asked to recall the story from the beginning of the session.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point for each correct item at each line.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	fm2cg010 fm2cg015 (Explore these variables in Discovery: ALSPAC Focus on Mothers 2 Clinic Dataset).
Descriptives:	Immediate recall: N = 2,946 Range = 3-25 Mean = 15.57 SD = 3.55  Delayed recall: N = 2,926 Range = 1-25 Mean = 14.38 SD = 3.77

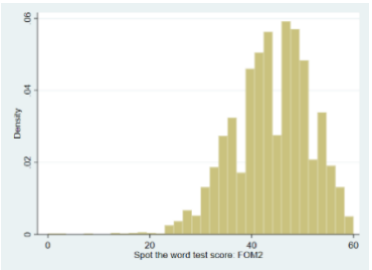
ALSPAC Focus on Mothers 2 (2011-2013): Logic memory (immediate and delayed)	
	
Age of participants (years):	Mean = 50.81 years, SD = 4.41, Range = 36.83 - 65.66
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 3; Age 52) • ALSPAC (Focus on Mothers clinic 4; Age 53)
Source:	Wechsler, D. (1998). Wechsler Memory Scale: Administration and scoring manual. London, UK: The Psychological Corporation.
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

6.15.2 Digits Backwards

ALSPAC Focus on Mothers 2 (2011-2013): Digits Backwards	
Domain:	Verbal memory
Measures:	Working memory
CHC:	Gsm (short-term memory)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting
Procedure:	The interviewer read aloud a series of numbers and asked the participant to immediately repeat them backwards. For example: • Interviewer: “1-5-9” • Participant: “9-5-1” The task was discontinued if the participant did not correctly recall any of the digits.
Link to	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-

ALSPAC Focus on Mothers 2 (2011-2013): Digits Backwards	
questionnaire:	measures/
Scoring:	Each item was scored 0, 1 or 2 points as follows: • 2 points = if the participant passed both trials • 1 points = if the participant passed only 1 trial • 0 points = if the participant failed both trials Maximum score = 14 points.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	fm2cg011 (Explore these variables in Discovery: ALSPAC Focus on Mothers 2 Clinic Dataset).
Descriptives:	N = 2,945 Range = 2-14 Mean = 7.08 SD = 2.36 
Age of participants (years):	Mean = 50.81 years, SD = 4.41, Range = 36.83- 65.66
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 3; Age 52) • ALSPAC (Focus on Mothers clinic 4; Age 53)
Source:	Wechsler, D. (1998).WAIS-III UK administration and scoring manual. London, UK: The Psychological Corporation.
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

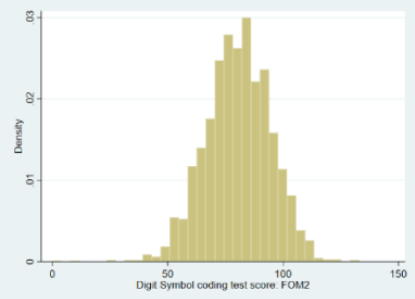
6.15.3 Spot the Word

ALSPAC Focus on Mothers 2 (2011-2013): Spot the word	
Domain:	Reading ability
Measures:	Reading comprehension Reading decoding
CHC:	Grw (Reading/writing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting; pen and paper task
Procedure:	The participant was presented with a list of word-pairs. Each pair consisted of a real word, and a non-word. Participants were instructed to work through the pairs, placing a tick beside the real word in each pair. The participant was given a practice list before the real trial. If the participant spent too long deliberating over a pair, they were prompted to guess.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point for each correct item.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	fm2cg012 (Explore these variables in Discovery: ALSPAC Focus on Mothers 2 Clinic Dataset).
Descriptives:	N = 2,939 Range = 0 - 60 Mean = 43.92 SD = 7.60 
Age of participants (years):	Mean = 50.81 years, SD = 4.41, Range = 36.83 - 65.66
Other sweep	• ALSPAC (Focus on Mothers clinic 3; Age 52)

ALSPAC Focus on Mothers 2 (2011-2013): Spot the word	
and/or cohort:	• ALSPAC (Focus on Mothers clinic 4; Age 53)
Source:	Baddeley, A., Emslie, H., & Nimmo-Smith, I. (1993). The Spot-the-Word test: A robust estimate of verbal intelligence based on lexical decision. *British Journal of Clinical Psychology*, 32(1), 55-65.
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. *Psychology and Aging*, 32(6), 521-530.

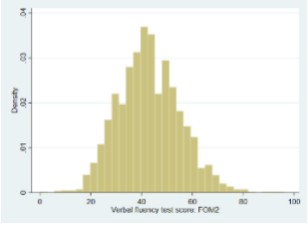
6.15.4 Digit Symbol Coding

ALSPAC Focus on Mothers 2 (2011-2013): Digit Symbol Coding	
Domain:	Non-verbal memory and processing speed
Measures:	Visual perception Short-term memory Motor coordination
CHC:	Gs (processing speed) Glr (long-term storage and retrieval) Gv (Visual Processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting; pen and paper task
Procedure:	Participants were presented with a series of numbers that were each associated with unique symbols. They were then presented with a list of numbers and asked to copy the matching symbols as quickly as possible. A practice trial was administered, and the real test lasted for 120 seconds.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point was awarded for each correctly copied symbol within the allotted time.
Item-level variable(s):	Not readily available.
Total	fm2cg013

ALSPAC Focus on Mothers 2 (2011-2013): Digit Symbol Coding	
score/derived variable(s):	(Explore these variables in Discovery: ALSPAC Focus on Mothers 2 Clinic Dataset).
Descriptives:	N = 2,922 Range = 0 - 133 Mean = 80.56 SD = 13.99 
Age of participants (years):	Mean = 50.81 years, SD = 4.41, Range = 36.83 - 65.66
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 3; Age 52) • ALSPAC (Focus on Mothers clinic 4; Age 53)
Source:	Wechsler, D. (1998). WAIS-III UK administration and scoring manual. London, UK: The Psychological Corporation
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

6.15.5 Verbal Fluency Test

ALSPAC Focus on Mothers 2 (2011-2013): Verbal Fluency Test	
Domain:	Verbal fluency
Measures:	Verbal/semantic fluency Associational fluency Executive function
CHC:	Glr (Long-Term Storage and Retrieval)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)

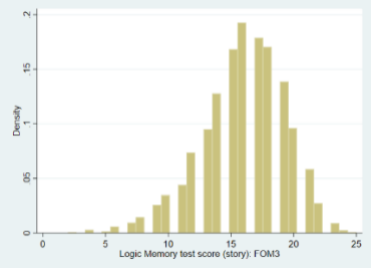
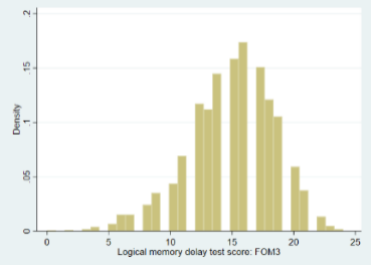
ALSPAC Focus on Mothers 2 (2011-2013): Verbal Fluency Test	
Administration method:	Trained interviewer; face to face; clinical setting
Procedure:	Participants were given one minute in which to say as many words as possible beginning with a specific letter. They were instructed not to include proper nouns (e.g. people or place names), numbers, repetitions or variations of the same word (e.g. see - seeing). Three trials were administered (letters 'C', 'F' and 'L'), each lasting one minute.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point was awarded for each correct word. The total scores from the three trials were summed to create a summary score.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	fm2cg014 (Explore these variables in Discovery: ALSPAC Focus on Mothers 2 Clinic Dataset).
Descriptives:	N = 2,924 Range = 0 - 96 Mean = 42.91 SD = 12.09 
Age of participants (years):	Mean = 50.81 years, SD = 4.41, Range = 36.83- 65.66
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 3; Age 52) • ALSPAC (Focus on Mothers clinic 4; Age 53) • NSHD (Age 53)* • NCDS (Age 50)* • NCDS (Age 62 [proposed])* • BCS70 (Age 46)* *Participants asked to name as many animals as possible within one minute. One trial only.

ALSPAC Focus on Mothers 2 (2011-2013): Verbal Fluency Test	
Source:	Lezak, M. (2004). Neuropsychological assessment. New York, NY: Oxford University Press.
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

6.16 ALSPAC Focus on Mothers 3 (FOM3; 2013-2014)

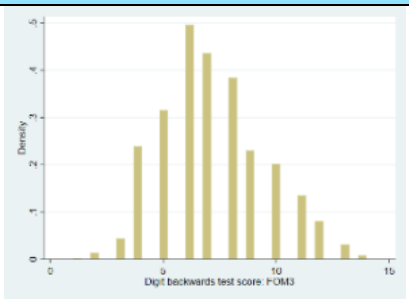
6.16.1 Logic Memory (Immediate and Delayed)

ALSPAC Focus on Mothers 3 (2013-2014): Logic Memory (immediate and delayed)	
Domain:	Verbal memory
Measures:	Attention Short-term episodic memory Verbal memory
CHC:	Glr (long-term storage and retrieval)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting
Procedure:	Participants were played an audio recording of a short story, and were asked to recount the story, using as close to the original wording as possible. They were given one minute to recount as much information as they could remember, with occasional prompts of encouragement (e.g. 'Anything else?') from the tester. After completing all other cognitive assessments, participants were again asked to recall the story from the beginning of the session.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point for each correct item at each line
Item-level variable(s):	Not readily available
Total	• fm3cg010

ALSPAC Focus on Mothers 3 (2013-2014): Logic Memory (immediate and delayed)	
score/derived variable(s):	• fm3cg015 (Explore these variables in Discovery: ALSPAC Focus on Mother 3 Clinic Dataset)
Descriptives:	Immediate recall: N = 2,985 Range = 2 - 25 Mean = 15.95 SD = 3.29  Delayed recall: N = 2,985 Range = 0 - 24 Mean = 14.94 SD = 3.53 
Age of participants (years):	Mean = 52.00 years, SD = 4.45, Range = 38 - 67
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 2; Age 50) • ALSPAC (Focus on Mothers clinic 4; Age 53)
Source:	Wechsler, D. (1998). Wechsler Memory Scale: Administration and scoring manual. London, UK: The Psychological Corporation.
Technical resources:	None
Example articles:	Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

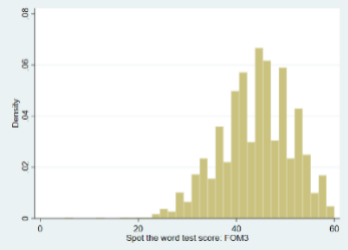
6.16.2 Digits Backwards

ALSPAC Focus on Mothers 3 (2013-2014): Digits Backwards	
Domain:	Verbal memory
Measures:	Working memory
CHC:	Gsm (short-term memory)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting
Procedure:	The interviewer read aloud a series of numbers and asked the participant to immediately repeat them backwards. For example: • Interviewer: "1 – 5 – 9" • Participant: "9 – 5 – 1" The task was discontinued if the participant did not correctly recall any of the digits.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Each item was scored 0, 1 or 2 points as follows: • 2 points = if the participant passed both trials • 1 point = if the participant passed only 1 trial • 0 points = if the participant failed both trials Maximum score = 14 points.
Item-level variable(s):	Not readily available
Total score/derived variable(s):	fm3cg011 (Explore these variables in Discovery: ALSPAC Focus on Mother 3 Clinic Dataset)
Descriptives:	N = 2,987 Range = 1 - 14 Mean = 7.20 SD = 2.28

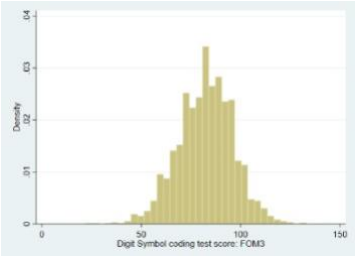
ALSPAC Focus on Mothers 3 (2013-2014): Digits Backwards	
	
Age of participants (years):	Mean = 52.00 years, SD = 4.45, Range = 38 - 67
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 2; Age 50) • ALSPAC (Focus on Mothers clinic 4; Age 53)
Source:	Wechsler, D. (1998). WAIS-III UK administration and scoring manual. London, UK: The Psychological Corporation.
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

6.16.3 Spot the Word

ALSPAC Focus on Mothers 3 (2013-2014): Spot the word	
Domain:	Reading ability
Measures:	Reading comprehension Reading decoding
CHC:	Grw (Reading/writing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting; pen and paper task
Procedure:	The participant was presented with a list of word-pairs. Each pair consisted of a real word, and a non-word. Participants were instructed to work through the pairs, placing a tick beside the real word in each pair. The participant was given a practice list before the real trial. If the participant spent too long deliberating over a

ALSPAC Focus on Mothers 3 (2013-2014): Spot the word	
	pair, they were prompted to guess.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point for each correct item.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	fm3cg012 (Explore these variables in Discovery: ALSPAC Focus on Mother 3 Clinic Dataset)
Descriptives:	N = 2,978 Range = 5-60 Mean = 43.99 SD = 7.40 
Age of participants (years):	Mean = 52.00 years, SD = 4.45, Range = 38 - 67
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 2; Age 50) • ALSPAC (Focus on Mothers clinic 4; Age 53)
Source:	Baddeley, A., Emslie, H., & Nimmo-Smith, I. (1993). The Spot-the-Word test: A robust estimate of verbal intelligence based on lexical decision. British Journal of Clinical Psychology, 32(1), 55-65.
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

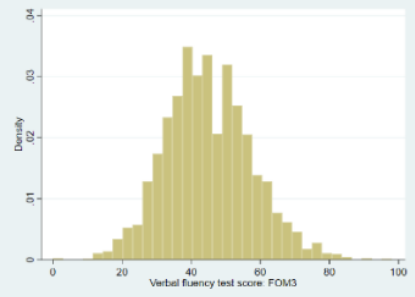
6.16.4 Digit Symbol Coding

ALSPAC Focus on Mothers 3 (2013-2014): Digit Symbol Coding	
Domain:	Non-verbal memory and processing speed
Measures:	Visual perception Short-term memory Motor coordination
CHC:	Gs (processing speed) Glr (long-term storage and retrieval) Gv (Visual Processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting; pen and paper task
Procedure:	Participants were presented with a series of numbers that were each associated with unique symbols. They were then presented with a list of numbers and asked to copy the matching symbols as quickly as possible. A practice trial was administered, and the real test lasted for 120 seconds.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point was awarded for each correctly copied symbol within the allotted time.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	fm3cg013 (Explore these variables in Discovery: ALSPAC Focus on Mother 3 Clinic Dataset.)
Descriptives:	N = 2,979 Range = 22-133 Mean = 82.50 SD = 13.77 
Age of	Mean = 52.00 years, SD = 4.45, Range = 38 - 67

ALSPAC Focus on Mothers 3 (2013-2014): Digit Symbol Coding	
participants (years):	
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 2; Age 50) • ALSPAC (Focus on Mothers clinic 4; Age 53)
Source:	Wechsler, D. (1998). WAIS-III UK administration and scoring manual. London, UK: The Psychological Corporation
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

6.16.5 Verbal Fluency Test

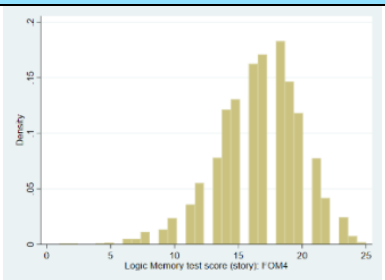
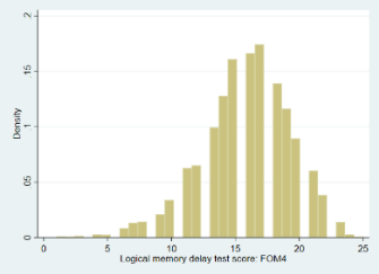
ALSPAC Focus on Mothers 3 (2013-2014): Verbal Fluency Test	
Domain:	Verbal fluency
Measures:	Verbal/semantic fluency Associational fluency Executive function
CHC:	Glr (Long-Term Storage and Retrieval)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting
Procedure:	Participants were given one minute in which to say as many words as possible beginning with a specific letter. They were instructed not to include proper nouns (e.g. people or place names), numbers, repetitions or variations of the same word (e.g. see - seeing). Three trials were administered (letters 'C', 'F' and 'L'), each lasting one minute.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point was awarded for each correct word. The total scores from the three trials were summed to create a summary score.
Item-level variable(s):	Not readily available.

ALSPAC Focus on Mothers 3 (2013-2014): Verbal Fluency Test	
Total score/derived variable(s):	fm3cg014 (Explore these variables in Discovery: ALSPAC Focus on Mother 3 Clinic Dataset.)
Descriptives:	N = 2,976 Range = 0 - 98 Mean = 44.93 SD = 12.46 
Age of participants (years):	Mean = 52.00 years, SD = 4.45, Range = 38 - 67
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 2; Age 50) • ALSPAC (Focus on Mothers clinic 4; Age 53) • NSHD (Age 53)* • NCDS (Age 50)* • NCDS (Age 62 [proposed])* • BCS70 (Age 46)* *Participants asked to name as many animals as possible within one minute. One trial only.
Source:	Lezak, M. (2004). Neuropsychological assessment. New York, NY: Oxford University Press.
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

6.17 ALSPAC Focus on Mothers 4 (FOM4; 2014-2015)

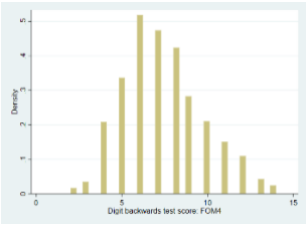
6.17.1 Logic Memory (Immediate and Delayed)

ALSPAC Focus on Mothers 4 (2014-2015): Logic memory (immediate and delayed)	
Domain:	Verbal memory
Measures:	Attention Short-term episodic memory Verbal memory
CHC:	Glr (long-term storage and retrieval)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting
Procedure:	Participants were played an audio recording of a short story, and were asked to recount the story, using as close to the original wording as possible. They were given one minute to recount as much information as they could remember, with occasional prompts of encouragement (e.g. 'Anything else?') from the tester. After completing all other cognitive assessments, participants were again asked to recall the story from the beginning of the session.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point for each correct item at each line
Item-level variable(s):	Not readily available
Total score/derived variable(s):	• fm4cg010 • fm4cg015 (Explore these variables in Discovery: ALSPAC Focus on Mothers 4 Clinic Dataset)
Descriptives:	Immediate recall: N = 2,852 Range = 1-25 Mean = 16.60 SD = 3.32

ALSPAC Focus on Mothers 4 (2014-2015): Logic memory (immediate and delayed)	
	 Delayed recall: N = 2,851 Range = 1-25 Mean = 15.82 SD = 3.51 
Age of participants (years):	Mean = 53.13 years, SD = 4.43, Range = 40 - 67
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 2; Age 50) • ALSPAC (Focus on Mothers clinic 3; Age 52)
Source:	Wechsler, D. (1998). Wechsler Memory Scale: Administration and scoring manual. London, UK: The Psychological Corporation.
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

6.17.2 Digits Backwards

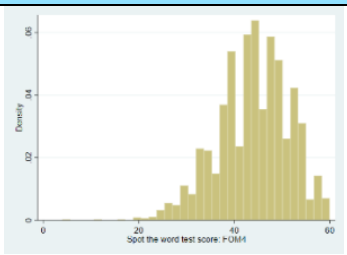
ALSPAC Focus on Mothers 4 (2014-2015): Digits Backwards	
Domain:	Verbal memory
Measures:	Working memory
CHC:	Gsm (short-term memory)

ALSPAC Focus on Mothers 4 (2014-2015): Digits Backwards	
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting
Procedure:	The interviewer read aloud a series of numbers and asked the participant to immediately repeat them backwards. For example: • Interviewer: "1-5-9" • Participant: "9-5-1" The task was discontinued if the participant did not correctly recall any of the digits.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	Each item was scored 0, 1 or 2 points as follows: • 2 points = if the participant passed both trials • 1 point = if the participant passed only 1 trial • 0 points = if the participant failed both trials Maximum score = 14 points
Item-level variable(s):	Not readily available
Total score/derived variable(s):	fm4cg011 (Explore these variables in Discovery: ALSPAC Focus on Mothers 4 Clinic Dataset)
Descriptives:	N = 2,846 Range = 2-14 Mean = 7.40 SD = 2.34 
Age of participants (years):	Mean = 53.13 years, SD = 4.43, Range = 40 - 67
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 2; Age 50) • ALSPAC (Focus on Mothers clinic 3; Age 52)
Source:	Wechsler, D. (1998). WAIS-III UK administration and scoring

ALSPAC Focus on Mothers 4 (2014-2015): Digits Backwards	
	manual. London, UK: The Psychological Corporation.
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

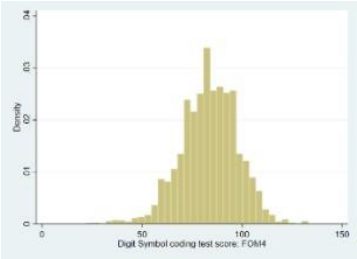
6.17.3 Spot the Word

ALSPAC Focus on Mothers 4 (2014-2015): Spot the word	
Domain:	Reading ability
Measures:	Reading comprehension Reading decoding
CHC:	Grw (Reading/Writing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting; pen and paper task
Procedure:	The participant was presented with a list of word-pairs. Each pair consisted of a real word, and a non-word. Participants were instructed to work through the pairs, placing a tick beside the real word in each pair. The participant was given a practice list before the real trial. If the participant spent too long deliberating over a pair, they were prompted to guess.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point for each correct item.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	fm4cg012 (Explore these variables in Discovery: ALSPAC Focus on Mothers 4 Clinic Dataset)
Descriptives:	N = 2,842 Range = 4 - 60 Mean = 44.03 SD = 7.51

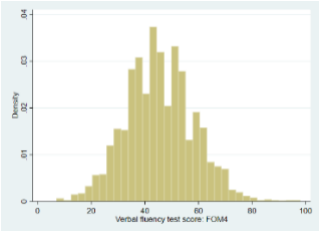
ALSPAC Focus on Mothers 4 (2014-2015): Spot the word	
	
Age of participants (years):	Mean = 53.13 years, SD = 4.43, Range = 40 - 67
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 2; Age 50) • ALSPAC (Focus on Mothers clinic 3; Age 52)
Source:	Baddeley, A., Emslie, H., & Nimmo-Smith, I. (1993). The Spot-the-Word test: A robust estimate of verbal intelligence based on lexical decision. British Journal of Clinical Psychology, 32(1), 55-65.
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

6.17.4 Digit Symbol Coding

ALSPAC Focus on Mothers 4 (2014-2015): Digit Symbol Coding	
Domain:	Non-verbal memory and processing speed
Measures:	Visual perception Short-term memory Motor coordination
CHC:	Gs (processing speed) Glr (long-term storage and retrieval) Gv (Visual Processing)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting; pen and paper task
Procedure:	Participants were presented with a series of numbers that were each associated with unique symbols. They were then presented

ALSPAC Focus on Mothers 4 (2014-2015): Digit Symbol Coding	
	with a list of numbers and asked to copy the matching symbols as quickly as possible. A practice trial was administered, and the real test lasted for 120 seconds.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point was awarded for each correctly copied symbol within the allotted time.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	fm4cg013 (Explore these variables in Discovery: ALSPAC Focus on Mothers 4 Clinic Dataset)
Descriptives:	N = 2,847 Range = 22-133 Mean = 83.63 SD = 14.14 
Age of participants (years):	Mean = 53.13 years, SD = 4.43, Range = 40 - 67
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 2; Age 50) • ALSPAC (Focus on Mothers clinic 3; Age 52)
Source:	Wechsler, D. (1998). WAIS-III UK administration and scoring manual. London, UK: The Psychological Corporation
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

6.17.5 Verbal Fluency Test

ALSPAC Focus on Mothers 4 (2014-2015): Verbal Fluency Test	
Domain:	Verbal fluency
Measures:	Verbal/semantic fluency Associational fluency Executive function
CHC:	Glr (Long-Term Storage and Retrieval)
CLOSER source:	Explore this sweep in Discovery: ALSPAC Early Adulthood (19 years – 30 years 11 months)
Administration method:	Trained interviewer; face to face; clinical setting
Procedure:	Participants were given one minute in which to say as many words as possible beginning with a specific letter. They were instructed not to include proper nouns (e.g. people or place names), numbers, repetitions or variations of the same word (e.g. see - seeing). Three trials were administered (letters 'C', 'F' and 'L'), each lasting one minute.
Link to questionnaire:	http://www.bristol.ac.uk/alspac/researchers/our-data/clinical-measures/
Scoring:	One point was awarded for each correct word. The total scores from the three trials were summed to create a summary score.
Item-level variable(s):	Not readily available.
Total score/derived variable(s):	fm4cg014 (Explore these variables in Discovery: ALSPAC Focus on Mothers 4 Clinic Dataset)
Descriptives:	N = 2,838 Range = 7-98 Mean = 45.63 SD = 12.69 
Age of participants (years):	Mean = 53.13 years, SD = 4.43, Range = 40 - 67

ALSPAC Focus on Mothers 4 (2014-2015): Verbal Fluency Test	
Other sweep and/or cohort:	• ALSPAC (Focus on Mothers clinic 2; Age 50) • ALSPAC (Focus on Mothers clinic 3; Age 52) • NSHD (Age 53)* • NCDS (Age 50)* • NCDS (Age 62)* • BCS70 (Age 46)* *Participants asked to name as many animals as possible within one minute. One trial only.
Source:	Lezak, M. (2004). Neuropsychological assessment. New York, NY: Oxford University Press.
Technical resources:	None
Example articles:	• Anderson, E. L., Heron, J., Ben-Shlomo, Y., Kuh, D., Cooper, R., Lawlor, D. A., ... & Howe, L. D. (2017). Adversity in childhood and measures of aging in midlife: Findings from a cohort of British women. Psychology and Aging, 32(6), 521-530.

7. Millennium Cohort Study (MCS)

7.1 MCS1 Age 9 months (2001)

7.1.1 Developmental milestones

MCS1 (age 9 months; 2001): Developmental milestones	
Domain:	Fine and gross motor coordination Receptive and productive vocabulary
Measures:	Developmental milestones using questions from two developmental questionnaires: • 8 questions from Denver Developmental Screening Test (DDST) which assesses social and communication skills and fine and gross motor coordination • 5 items were chosen from a UK adaptation of MacArthur Communicative Development Inventories (CDI) identifies early communicative gestures
CHC:	N/A
CLOSER Source:	Not currently available in CLOSER Discovery
Administration method:	Parent report; face to face computer-assisted personal interview (CAPI)
Procedure:	Parents were asked to respond to selected statements from the tests, using a three-point scale: • "Often", "Once or twice", "Not yet" (for the Denver Developmental Screening Test) • "Often", "Sometimes", "Not yet" (for the MacArthur CDI). DDST question topics (gross motor coordination): sitting up without support, standing while holding on to something, walking a few steps unaided, moving about on the floor. DDST question topics (fine motor coordination): putting hands together, grabbing objects using the whole hand, picking up small objects with forefinger and thumb only, passing a toy between their hands. CDI question topics: smiling when smiled at, reaching to give an object they are holding, waving when someone leaves, extending arms to show they want to be picked up, nodding head for 'yes'.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS1_CAPI_Questionnaire_Documentation_March_2006_v1.1.pdf
Scoring:	None available

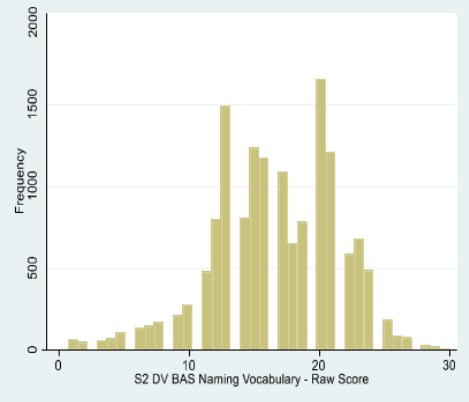
MCS1 (age 9 months; 2001): Developmental milestones	
Item-level variable(s):	• acsitu00 acstan00 acwalk00 acmove00 (DDST - gross) • achand00 acgrab00 acpick00 acptoy00 (DDST - fine) • acsmil00 acgive00 acwave00 acarms00 acnods00 (CDI)
Total score/derived variable(s):	None
Age of participants (days):	Mean = 295.5, SD = 15.25, Range = 243-382
Descriptives:	None available
Other sweep and/or cohort:	None
Source:	• Frankenburg, W. K., & Dodds, J. B. (1967). The Denver developmental screening test. The Journal of Pediatrics, 71(2), 181-191. • Fenson L., Dale P., Resnick J., Thal D., Bates E., Hartung J. P. et al. (1993). MacArthur Communicative Inventories. Singular Publishing Group, San Diego.
Technical resources:	Johnson, J., Atkinson, M., & Rosenberg, R. (2015). Millennium Cohort Study: Psychological, Developmental and Health Inventories. Centre for Longitudinal Studies, London. https://cls.ucl.ac.uk/wp-content/uploads/2018/08/Guide-to-Psychological-Inventories-in-MCS3.pdf
Example articles:	• Sacker, A., Quigley, M. A., & Kelly, Y. J. (2006). Breastfeeding and developmental delay: findings from the millennium cohort study. Pediatrics, 118(3), e682-e689.

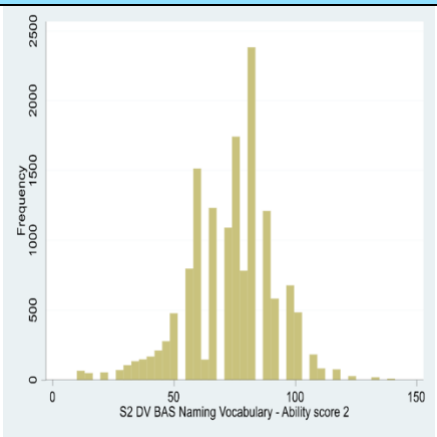
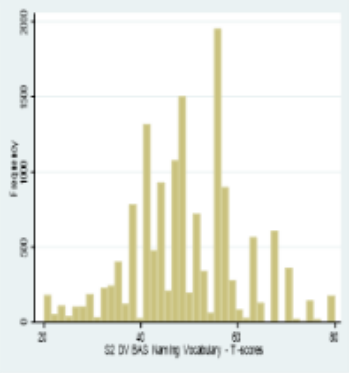
7.2 MCS2 Age 3 years (2004)

7.2.1 British Ability Scales II (BAS II): Naming Vocabulary

MCS2 (age 3 years; 2004): BAS II Naming Vocabulary	
Domain:	Verbal knowledge (expressive and spoken)
Measures:	The Naming Vocabulary is a verbal scale which assesses the spoken vocabulary of young children. The full BAS II version was employed. The test items consist of a booklet of coloured pictures of objects which the child is shown one at a time and

MCS2 (age 3 years; 2004): BAS II Naming Vocabulary	
	asked to name. The scale measures expressive language ability, and successful performance depends on the child's previous development of a vocabulary of nouns. Picture recognition is also crucial; however, the pictures are large and brightly coloured and are unlikely to cause problems except for children with major visual impairments or with no experience of picture books. The items require the child to recall words from long-term memory rather than to recognise or understand the meaning of words or sentences.
CHC:	Gc (Crystallised ability)
CLOSER source:	Explore this sweep in Discovery: MCS Age 3 Survey (2003)
Administration method:	Interviewer, face to face computer-assisted personal interview (CAPI) and verbal response
Procedure:	The cohort member was shown a picture and asked to name the object in the picture; the cohort member responded verbally and the response was recorded by the interviewer on the CAPI. There were 36 items (pictures of objects) in total - as in the original BAS. The test continued, unless: • the cohort member failed on 5 successive items • after item 16 (Ear), the cohort member has failed on three or more items administered. • after item 30 (Hourglass), the cohort member has failed on three or more items administered. • the cohort member completes the Naming Vocabulary subscale (i.e.: reaches item 36 (Easel)).
Link to questionnaire:	No direct link to pdf. Information can be found in the file 'a3723udb.pdf' which accompanies data download from UK Data Service.
Scoring:	36 items (pictures of objects) in total, starting at item 1 and first decision point at item 16. The raw scores were then adjusted using a set of standard adjustment tables to take account of the age of the cohort member and the difficulty of the item set administered.
Item-level variable(s):	• bca01a00 – bca36a00 (items (raw) first attempt) • bcre1a00 – bcr36a00 (why stopped) • bca01b00 – bca36b00 (items (raw) second attempt)

MCS2 (age 3 years; 2004): BAS II Naming Vocabulary	
	• bcre1b00 – bcr36b00 (why stopped) • bcapre00 – bcener00; bcenvi00 - bcslap00 (cognitive observations) • bcdurm00 (duration)
Total score/derived variable(s):	• bdbasr00 (raw score - total number of correct responses) • bdbasa00 (ability adjusted - total number of correct responses, accounting for the sets of items the CM was presented with, which depended on age and successful completion of blocks of items) • bdbast00 (ability and age adjusted on BAS II age normed data)
Descriptives:	bdbasr00 (raw score): N = 14,776 Range = 0 - 30 Mean = 16.62 SD = 4.81  bdbasa00 (ability adjusted): N = 14,776 Range = 10 - 141 Mean = 73.19 SD = 17.98

MCS2 (age 3 years; 2004): BAS II Naming Vocabulary	
	 bdbast00 (ability and age adjusted): N = 14,776 Range = 20 - 80 Mean = 49.34 SD = 11.45 
Age of participants (months):	Mean = 37.71, SD = 2.53, Range = 32 – 55
Other sweep and/or cohort:	• MCS (age 5) – different starting point (item 12) • BCS70 (children of cohort member, multi-age) • ALSPAC (age 2) – similar task involving objects
Source:	• Elliott, C. D., Smith, P., & McCulloch, K. (1996). British Ability Scales Second Edition (BAS II). Administration and Scoring Manual. London: Nelson. • Elliott, C. D., Smith, P., & McCulloch, K. (1997). British Ability • Scales Second Edition (BAS II). Technical Manual. London: Nelson.
Technical resources:	• Hansen K, ed. (2014). Millennium Cohort Study , A Guide to the Datasets (Eighth Edition) - First, Second, Third, Fourth and Fifth Surveys. London, UK: Centre for Longitudinal

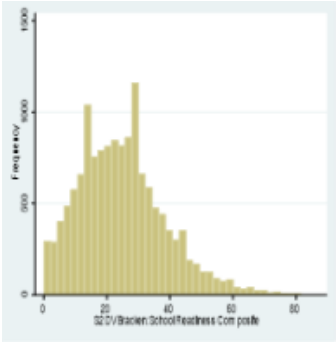
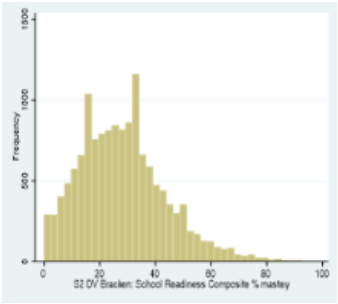
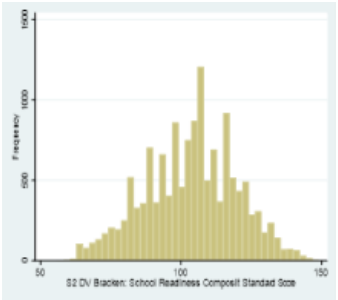
MCS2 (age 3 years; 2004): BAS II Naming Vocabulary	
	Studies, Institute of Education, University of London https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS-Guide-to-the-Datasets-022014.pdf • Connelly, R., Interpreting Test Scores. Millennium Cohort Study Data Note 2013/01. 2013, Centre for Longitudinal Studies: London. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS-data-note-20131-Test-Scores-Roxanne-Connelly.pdf • Hansen, K; Joshi, H; (2007) Millennium Cohort Study Second Survey: A User's Guide to Initial Findings. London: Centre for Longitudinal Studies. https://discovery.ucl.ac.uk/id/eprint/1562308/
Example articles:	• Jerrim, J., & Vignoles, A. (2013). Social mobility, regression to the mean and the cognitive development of high ability children from disadvantaged homes. *Journal of the Royal Statistical Society: Series A (Statistics in Society),* 176(4), 887-906. • Dockrell, J. E., & Hurry, J. (2018). The identification of speech and language problems in elementary school: Diagnosis and co- occurring needs. *Research in Developmental Disabilities. 81, 52-64.* • Midouhas, E., Kokosi, T., & Flouri, E. (2018). Outdoor and indoor air quality and cognitive ability in young children. *Environmental Research*, 161, 321-328.

7.2.2 Bracken School Readiness Assessment – Revised (BSRA-R)

MCS2 (age 3 years; 2004): Bracken School Readiness Assessment – Revised (BSRA-R)	
Domain:	Basic knowledge in preparation for school
Measures:	The BSRA-R is used to assess the 'readiness' of a child for formal education by testing their knowledge and understanding of basic concepts. The cohort members completed six sub-tests of the BSRA- R: • Colours: represents both primary colours and basic colour terms. • Letters: measures knowledge of both upper- and lower-case letters.

MCS2 (age 3 years; 2004): Bracken School Readiness Assessment – Revised (BSRA-R)	
	• Numbers/Counting: measures recognition of single- and double- digit numbers, and samples the ability to assign a number value to a set of objects. • Sizes: includes concepts that describe one, two, and three dimensions. • Comparisons: measures ability to match and/or differentiate objects based on one or more of their salient characteristics. • Shapes: includes one, two, and three-dimensional shapes. The one-dimensional category includes linear shapes; two-dimensional shapes are represented by concepts such as the circle, square, and triangle; and three-dimensional shapes include concepts such as the cube and pyramid. All sub-sets are designed to measure "readiness" concepts which a child should have mastered before they commence formal education.
CHC:	Gc (Crystallised ability) Gv (Visual processing) Gq (Quantitative Knowledge)
CLOSER source:	Explore this sweep in Discovery: MCS Age 3 Survey (2003).
Administration method:	Interviewer; face to face: non-verbal and interviewer records on Computer-Assisted Personal Interview (CAPI)
Procedure:	The exact tasks varied but, in essence, the cohort members were shown a page containing a number of visual stimuli and were asked to point to the one that matched what the interviewers read out. The CAPI script managed the scoring system for the assessments, which determined when one sub-test was terminated and the next one begun, based on the patterns of correct and incorrect answers. Each cohort member attempted at least some of each of each sub-test (unless the interviewer over-rode the script). Interviewers also had the option, based on how the cohort member was reacting, to terminate any sub-test, or the whole assessment, at any time. Duration: 10 - 15 minutes
Link to questionnaire:	For copyright reasons, the Bracken assessment is not freely available. BSRA-3 available at:

MCS2 (age 3 years; 2004): Bracken School Readiness Assessment – Revised (BSRA-R)	
	https://www.pearsonassessments.com/store/usassessments/en/Store/Professional-Assessments/Developmental-Early-Childhood/Bracken-School-Readiness-Assessment-%7C-Third-Edition/p/100000165.html
Scoring:	88 items in total, 6 sub-sets with varying number of items. 1 point for each correct response and 0 for incorrect response. Raw scores are provided for each sub-scale and are added together to provide a composite raw score, known as the School Readiness Composite (Bracken, 1998). To account for the differing number of items within each of the subscales, a percentage score (raw score relative to the number of items) score is also provided. In addition to the raw total score, there are also age-adjusted standardised scores (based on a US norming sample), percentiles and a normative classification which categories scores into a grouping based on the standardised composite score.
Item-level variable(s):	• bcco0100 – bcco1100 (11 colours) • bcle0100 – bcle1600 (16 letters) • bcno0100 – bcno1900 (19 numbers) • bcsz0100 – bcsz1200 (12 sizes) • bccm0100 – bccm1000 (10 comparisons) • bcsh0100 – bcsh2000 (20 shapes) • bcrknage (age in months)
Total score/derived variable(s):	• bdcosc00, bdcmas00 (colours: raw and percentage score) • bdlesc00, bdlmas00 (letters: raw and percentage score) • bdnosc00, bdnmas00 (numbers: raw and percentage score) • bdszsc00, bdsmas00 (sizes: raw and percentage score) • bdcmsc00, bdomas00 (comparisons: raw and percentage score) • bdshsc00, bdhmas00 (shapes: raw and percentage score) • bdbsrc00, bdsrcm00 (total: raw and percentage score) • bdsrcs00 (standardised) • bdsrcp00 (percentile) • bdsrcn00 (normative classification)
Descriptives:	bdshsc00 (raw score) N = 14,054 Range = 0 - 88

MCS2 (age 3 years; 2004): Bracken School Readiness Assessment – Revised (BSRA-R)	
	Mean = 24.86 SD = 13.65  bdsrcm00 (adjusted % subtest/items) N = 14,054 Range = 0 - 100 Mean = 28.25 SD = 15.51  bdsrcs00 (age adjusted and standardised) N = 14,039 Range = 56 - 149 Mean = 103.43 SD = 16.34 
Age of participants (months):	Mean = 37.71, SD = 2.53, Range = 32 - 55
Other sweep and/or cohort:	None

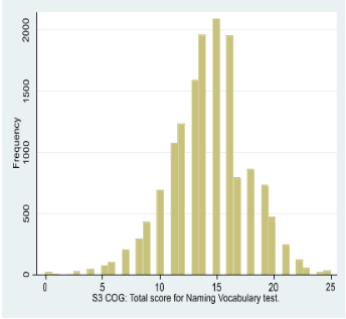
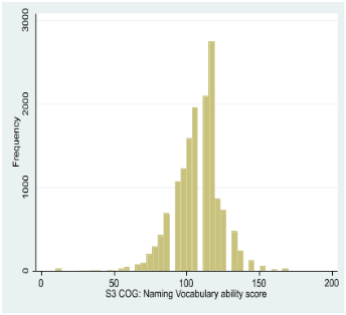
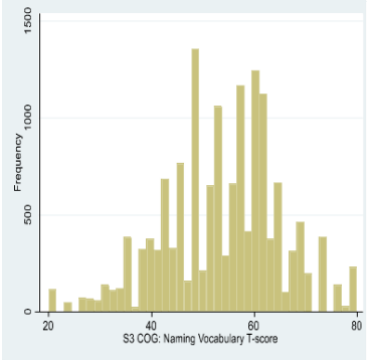
MCS2 (age 3 years; 2004): Bracken School Readiness Assessment – Revised (BSRA-R)	
Source:	6 subsets of Bracken, B. (1998). Bracken Basic Concept Scale Revised: Examiner's Manual. London: The Psychological Corporation.
Technical resources:	• Bracken, B.A. (2002). Bracken School Readiness Assessment: Administration Manual. San Antonio, Texas: Psychological Corporation. • Connelly, R. (2013) Interpreting Test Scores: Millennium Cohort Study Data Note 2013/01. Centre for Longitudinal Studies: London. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS-data-note-20131-Test-Scores-Roxanne-Connelly.pdf
Example articles:	• Kiernan, K. E., & Huerta, M. C. (2008). Economic deprivation, maternal depression, parenting and children's cognitive and emotional development in early childhood. *The British Journal of Sociology*, *59*(4), 783-806. • Jokela, M. (2010). Characteristics of the first child predict the parents' probability of having another child. *Developmental Psychology, 46*(4), 915-926. • Schoon, I., Hope, S., Ross, A., & Duckworth, K. (2010). Family hardship and children's development: the early years. Longitudinal and Life Course Studies, 1(3), 209-222.

7.3 MCS3 Age 5 years (2006)

7.3.1 British Ability Scales II (BAS II): Naming Vocabulary

MCS3 (age 5 years; 2006): BAS II Naming Vocabulary	
Domain:	Verbal knowledge (expressive)
Measures:	Spoken vocabulary: • Expressive language skills • Vocabulary knowledge of nouns • Ability to attach verbal labels to pictures • General knowledge • General language development • Retrieval of names from long-term memory • Level of language stimulation

MCS3 (age 5 years; 2006): BAS II Naming Vocabulary	
CHC:	Gc (Crystallised ability)
CLOSER source:	Explore this sweep in Discovery: MCS Age 5 Survey (2006).
Administration method:	Home interviewer; face to face, CM gives verbal response and interviewer records on Computer Assisted Personal Interview (CAPI)
Procedure:	The test items consisted of coloured pictures of objects shown one at a time and the cohort member was asked to name the object pictured. The interviewer showed the cohort member a picture in the BAS easel and asked "What is this?". The cohort member responded verbally and the response was recorded by the interviewer on the CAPI. The assessment stopped automatically if the cohort member made five consecutive errors – apart from at the beginning of the assessment, where if the cohort member made five consecutive errors, and had fewer than three correct answers, the assessment was routed to earlier items in the assessment, which were easier and contained additional teaching items. Duration: 4-5 minutes (from data)
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/mcs3_cogphys.pdf
Scoring:	36 items (pictures of objects) in total. Started at item 12 and decision point at item 30 (the starting and decision points for children aged 5).
Item-level variable(s):	• ccnsta00 (start point for test) • ccndec00 (decision point for test) • ccn12v00 – ccn30v00; ccn31v00 – ccn36v00; ccn01v00 – ccn11v00 (first attempt; items 12 - 30; 31 - 36; 1 - 11) • ccn12p00 – ccn30p00; ccn31p00 – ccn36p00; ccn01p00 – ccn11p00 (probed; items 12 - 30, 31 - 36; 1-11)
Total score/derived variable(s):	• ccnsco00 (raw score- total number of correct responses) • ccnvabil (ability adjusted- total number of correct responses, accounting for the sets of items the CM was presented with, which depended on age and successful completion of blocks of items) • ccnvtscore (ability and age adjusted on BAS II age normed data)

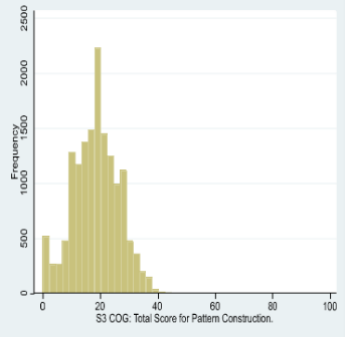
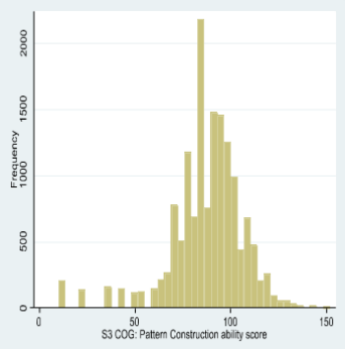
MCS3 (age 5 years; 2006): BAS II Naming Vocabulary	
Descriptives:	ccnsco00 (raw score): N = 15,168 Range = 0 - 25 Mean = 14.26 SD = 3.45  ccnvabil (ability adjusted): N = 15,168 Range = 10 - 170 Mean = 107.33 SD = 16.44  ccnvtscore (ability and age adjusted): N = 15,168 Range = 20 – 80 Mean = 53.81 SD = 11.25 
Age of	Mean = 62.68, SD = 3.00, Range = 53 – 74

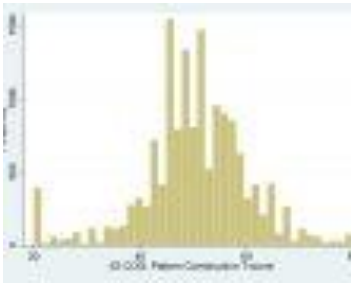
MCS3 (age 5 years; 2006): BAS II Naming Vocabulary	
participants (months):	
Other sweep and/or cohort:	• MCS (age 3): different starting point 1 • BCS70 (children of cohort member, multi-age) • ALSPAC (age 2): similar task involving objects
Source:	• Elliott, C. D., Smith, P., & McCulloch, K. (1996). British Ability Scales Second Edition (BAS II). Administration and Scoring Manual. London: Nelson. • Elliott, C. D., Smith, P., & McCulloch, K. (1997). British Ability Scales Second Edition (BAS II). Technical Manual. London: Nelson.
Technical resources:	Connelly, R. (2013). Interpreting Test Scores: Millennium Cohort Study Data Note 2013/01. Centre for Longitudinal Studies: London. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS-data-note-20131-Test-Scores-Roxanne-Connelly.pdf
Example articles:	• Carson, C., Kelly, Y., Kurinczuk, J. J., Sacker, A., Redshaw, M., & Quigley, M. A. (2011). Effect of pregnancy planning and fertility treatment on cognitive outcomes in children at ages 3 and 5: longitudinal cohort study. BMJ, 343, d4473. • Goodman, A., Gregg, P., & Washbrook, E. (2011). Children's educational attainment and the aspirations, attitudes and behaviours of parents and children through childhood. Longitudinal and Life Course Studies, 2(1), 1-18. • Law, J., Rush, R., Anandan, C., Cox, M., & Wood, R. (2012). Predicting language change between 3 and 5 years and its implications for early identification. Pediatrics, 130(1), e132-7.

7.3.2 BAS II: Pattern Construction

MCS3 (age 5 years; 2006): Pattern Construction	
Domain:	Non-verbal (spatial problem-solving)
Measures:	Non-verbal spatial ability: • Visuo-spatial analysis, decomposing a design into its component parts • Perception of relative orientation

MCS3 (age 5 years; 2006): Pattern Construction	
	• Visuo-spatial matching, including size, angles and orientation • Spatial problem-solving, including use of strategies such as sequential assembly or trial and error, and ability to synthesize • Eye-hand coordination • Low scores: poor motor control
CHC:	Gv (Visual Processing)
CLOSER source:	Explore this sweep in Discovery: MCS Age 5 Survey (2006).
Administration method:	Home interviewer; face to face; CM completes tasks and interviewer records outcome and timing on Computer-Assisted Personal Interview (CAPI).
Procedure:	The assessment comprised 23 items and four example items. For each item, a pattern was presented to the cohort member, and the cohort member was asked to replicate the pattern using flat foam squares or solid plastic cubes with black and yellow patterns on each side. All of the cohort members started the assessment at the beginning with Example A, as this is the appropriate starting point for children of this age. On completion of each pattern, the interviewer coded whether or not the pattern was constructed correctly, and whether or not the pattern was constructed within the time limit. The patterns increased in complexity as the assessment progressed. The assessment stopped automatically if a cohort member made four errors in five consecutive items. Duration: 13-15 minutes (from data)
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/mcs3_cogphys.pdf
Scoring:	Score is based on accuracy and speed. Starts at item 1 and first decision point at item 13, for this age-group.
Item-level variable(s):	• ccccon0a – ccccon0v (number of failures in 5 items) • ccc01a00 - ccc07a00 (squares; outcome) • ccc01b00 - ccc07b00 (squares; response) • ccc08a00 - ccc13a00 (cubes1; outcome) • ccc08b00 - ccc13b00 (cubes1; response) • ccc14a00 - ccc23a00 (cubes2; outcome)

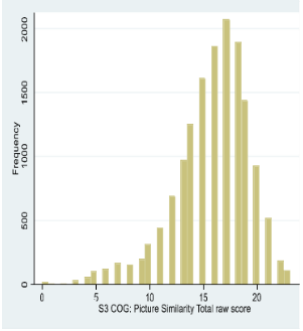
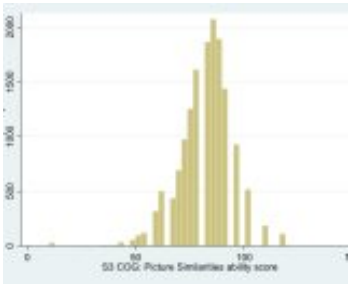
MCS3 (age 5 years; 2006): Pattern Construction	
	• ccc14b00 - ccc23b00 (cubes2;response)
Total score/derived variable(s):	• cccsco00 (raw score- total number of correct responses) • ccpcabil (ability adjusted- total number of correct responses, accounting for the sets of items the CM was presented with, which depended on age and successful completion of blocks of items) • ccpctscore (ability and age adjusted on BAS II age normed data)
Descriptives:	cccsco00 (raw score): N = 15,126 Range = 0 - 92 Mean = 18.41 SD = 7.92  ccpcabil (ability adjusted): N = 15,110 Range = 10 - 152 Mean = 87.26 SD = 19.57  ccpctscore (ability and age adjusted) N = 15,110 Range = 20 - 80 Mean = 50.27

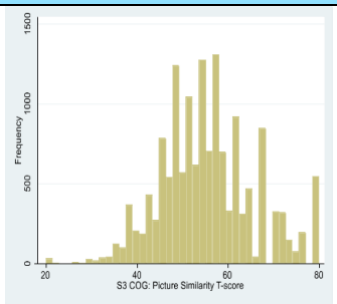
MCS3 (age 5 years; 2006): Pattern Construction	
	SD = 10.07 
Age of participants (months):	Mean = 62.68, SD = 2.99, Range = 53 - 74
Other sweep and/or cohort:	• MCS (age 7) • ALSPAC (age 4 and 8.5) – Block Design
Source:	• Elliott, C. D., Smith, P., & McCulloch, K. (1996). British Ability Scales Second Edition (BAS II). Administration and Scoring Manual. London: Nelson. • Elliott, C. D., Smith, P., & McCulloch, K. (1997). British Ability Scales Second Edition (BAS II). Technical Manual. London: Nelson.
Technical resources:	Connelly, R. (2013). Interpreting Test Scores. Millennium Cohort Study Data Note 2013/01. Centre for Longitudinal Studies: London. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS-data-note-20131-Test-Scores-Roxanne-Connelly.pdf
Example articles:	• Sullivan, A., Ketende, S., & Joshi, H. (2013). Social Class and Inequalities in Early Cognitive Scores. Sociology, 47(6), 1187-1206. • Martin, A., Booth, J. N., Young, D., Revie, M., Boyter, A. C., Johnston, B., ... & Reilly, J. J. (2016). Associations between obesity and cognition in the pre-school years. Obesity, 24(1), 207-214.

7.3.3 BAS II: Picture Similarities

MCS3 (age 5 years; 2006): BAS II Picture Similarities	
Domain:	Non-verbal reasoning (pictorial)
Measures:	Reasoning ability of pre-school children: • Non-verbal problem solving (inductive reasoning)

MCS3 (age 5 years; 2006): BAS II Picture Similarities	
	• Visual perception and analysis • Ability to attach meaning to pictures • Ability to develop and test hypotheses • Use of verbal mediation • General knowledge
CHC:	Gf (Fluid ability)
CLOSER source:	Explore this sweep in Discovery: MCS Age 5 Survey (2006).
Administration method:	Interviewer; face to face; CM completes tasks; interviewer uses Computer-Assisted Personal Interview (CAPI) programme for instructions and recording outcome
Procedure:	For each item, the cohort member was shown a row of four pictures or designs, and the cohort member placed a fifth card below the stimulus picture it best matched. Increasing difficulty in items required the cohort member to recognise a relationship based on a common concept or element. The assessment comprised of 33 items. The number of items administered during the assessment was dependent on the age of the cohort member and their performance during the assessment. All of the cohort members started at item 11, corresponding to the start point for cohort members of their age. If a cohort member gave six or more incorrect responses in any consecutive set of eight items, then the assessment stopped. The exception to this is the first eight items at the start of the assessment, where if a cohort member gave six or more incorrect responses the CAPI routes the assessment to earlier items, which are easier, and include additional teaching items. Duration: 7-8 minutes
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/mcs3_cogphys.pdf
Scoring:	1 point for each correct item. Starts at item 11 and decision point at item 33.
Item-level variable(s):	• ccp01s00 – ccp33s00 • ccpsta00 (starting point) • ccpdec00 (decision point)
Total score/derived	• ccpsco00 (raw score- total number of correct responses) ccpsabil (ability adjusted- total number of correct responses,

MCS3 (age 5 years; 2006): BAS II Picture Similarities	
variable(s):	• accounting for the sets of items the CM was presented with, which depended on age and successful completion of blocks of items) • ccpstscore (ability and age adjusted on BAS II age normed data)
Descriptives:	ccpsco00 (raw score): N = 15,188 Range = 0 - 23 Mean = 15.76 SD = 3.53  ccpsabil (ability adjusted): N = 15,188 Range = 10 - 119 Mean = 82.09 SD = 11.93  ccpstscore (ability and age adjusted): N = 15,110 Range = 20 – 80 Mean = 55.52 SD = 10.28

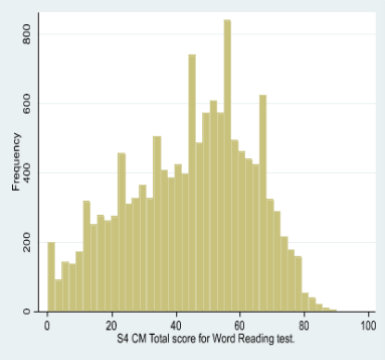
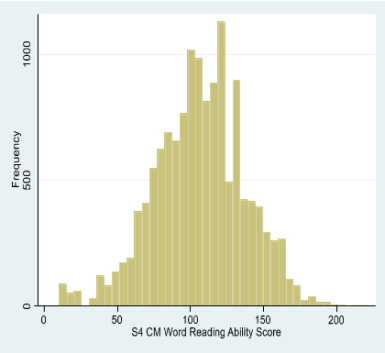
MCS3 (age 5 years; 2006): BAS II Picture Similarities	
	
Age of participants (months):	Mean = 62.68, SD = 3.00, Range = 53 - 74
Other sweep and/or cohort:	None
Source:	• Elliott, C. D., Smith, P., & McCulloch, K. (1996). British Ability Scales Second Edition (BAS II). Administration and Scoring Manual. London: Nelson. • Elliott, C. D., Smith, P., & McCulloch, K. (1997). British Ability Scales Second Edition (BAS II). Technical Manual. London: Nelson.
Technical resources:	Connelly, R. (2013). Interpreting Test Scores. Millennium Cohort Study Data Note 2013/01. Centre for Longitudinal Studies: London. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS-data-note-20131-Test-Scores-Roxanne-Connelly.pdf
Example articles:	• Flouri, E., Midouhas, E., & Joshi, H. (2015). Family and neighbourhood risk and children's problem behaviour: The moderating role of intelligence. Intelligence, 53, 33-42. • Bruckauf, Z., & Chzhen, Y. (2016). Poverty and Children's Cognitive Trajectories: Evidence from the United Kingdom Millennium Cohort Study, Innocenti Working Paper No.2016-14, UNICEF Office of Research, Florence.

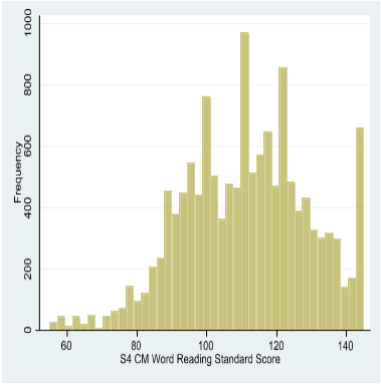
7.4 MCS4 Age 7 years (2008)

7.4.1 British Ability Scales II (BAS II): Word Reading

MCS4 (age 7 years; 2008): BAS II Word Reading	
Domain:	Verbal (reading)

MCS4 (age 7 years; 2008): BAS II Word Reading	
	School knowledge - reading (achievement scale)
Measures:	Word decoding ability: • Recognition and oral reading of single words (lack of contextual clues): • Recognition of printed words • Visual and auditory working memory • Skills in word analysis without additional contextual clues • Vocabulary knowledge Low scores: • Poor visual memory • Short term auditory memory for sequences • Poor skills in phonological segmentation of words into component sounds or syllables • Poor skills in sound blending • Poor auditory discrimination
CHC:	Gc (Crystallised ability) Grw (Reading/Writing)
CLOSER source:	Explore this sweep in Discovery: MCS Age 7 Survey (2008).
Administration method:	Home interview using Computer-Assisted Personal Interview (CAPI), face to face; verbal reading
Procedure:	The child read aloud a series of words presented on a card. The assessment consisted of 90 words in total. The words were organised into 9 blocks of 10 words in ascending order of difficulty. The child was asked to read each word in a block out loud to the interviewer. The number of blocks of words the child was asked to attempt to read was dependent on the child's performance during the assessment. All of the children in MCS4 started at the first item, as this was the starting point for children of their age. As the child read the words, the interviewer recorded whether or not the child pronounced each word correctly in the CAPI. A child's progression through the assessment was dependent on the number of words they read correctly. If a child made eight errors in a block of 10 words, then the assessment stopped. Duration: 5-6 minutes
Link to	https://cls.ucl.ac.uk/wp-

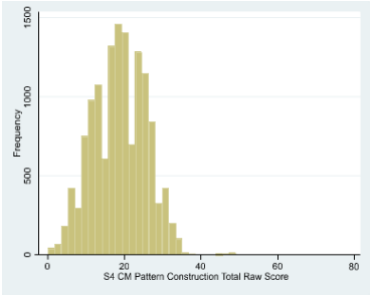
MCS4 (age 7 years; 2008): BAS II Word Reading	
questionnaire:	content/uploads/2017/07/mcs4_cog_phys_documentation.pdf
Scoring:	1 point for each correct word
Item-level variable(s):	DCWR0100 – DCWR9000
Total score/derived variable(s):	• DCWRSC00 (raw score- total number of correct responses) • DCWRAB00 (ability adjusted- total number of correct responses, accounting for the sets of items the CM was presented with, which depended on age and successful completion of blocks of items) • DCWRSD00 (ability and age adjusted on BAS II age normed data)
Descriptives:	DCWRSC00 (raw score): N = 13,591 Range = 0 - 90 Mean = 44.05 SD = 19.37  DCWRAB00 (ability adjusted): N = 13,591 Range = 10 - 222 Mean = 106.43 SD = 30.87  DCWRSD00 (ability and age adjusted):

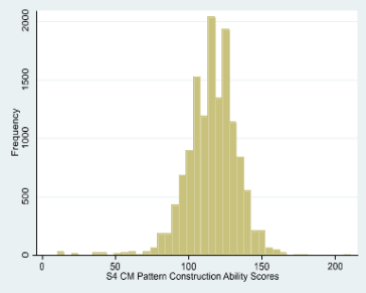
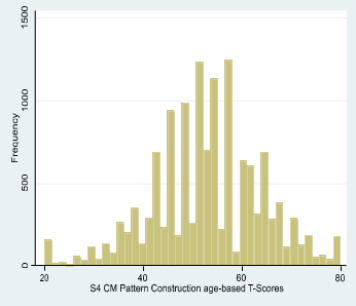
MCS4 (age 7 years; 2008): BAS II Word Reading	
	N = 13,591 Range = 0 - 90 Mean = 44.05 SD = 19.37 
Age of participants (months):	Mean = 86.72, SD = 2.98, Range = 76 - 98
Other sweep and/or cohort:	• NSHD (age 8 and 11) – National Foundation for Educational Research (NFER) test • BCS70 (children of cohort member, multi-age)
Source:	• Elliott, C. D., Smith, P., & McCulloch, K. (1996). British Ability Scales Second Edition (BAS II). Administration and Scoring Manual. London: Nelson. • Elliott, C. D., Smith, P. & McCulloch, K. (1997). British Ability Scales • Second Edition (BAS II). Technical Manual. London: Nelson.
Technical resources:	• Chaplin Gray, J., Gatenby, R., Simmonds, N., & Huang, Y. (2010). Millennium Cohort Study Sweep 4: Technical Report (Second Edition). London: NatCen. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS4-technical-report-second-edition-September-2010_v2.pdf • Connelly, R. (2013). Interpreting Test Scores. Millennium Cohort Study Data Note 2013/01. Centre for Longitudinal Studies: London. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS-data-note-20131-Test-Scores-Roxanne-Connelly.pdf
Example articles:	• Russell, G., Ryder, D., Norwich, B., & Ford, T. (2015). Behavioural Difficulties that co-occur with specific word reading difficulties: A UK population based cohort study.

MCS4 (age 7 years; 2008): BAS II Word Reading	
	Dyslexia, 21(2), 123-141. • Bono, E. D., Francesconi, M., Kelly, Y., & Sacker, A. (2016). Early maternal time investment and early child outcomes. The Economic Journal, 126(596), F96-F135. • Dickerson, A., & Popli, G. K. (2016). Persistent poverty and children's cognitive development: evidence from the UK Millennium Cohort Study. Journal of the Royal Statistical Society: Series A (Statistics in Society), 179(2), 535-558.

7.4.2 BAS II: Pattern Construction

MCS4 (age 7 years; 2008): BAS II Pattern Construction	
Domain:	Non-verbal (Spatial problem-solving)
Measures:	Non-verbal spatial ability: • Visuo-spatial analysis, decomposing a design into its component parts • Perception of relative orientation • Visuo-spatial matching, including size, angles and orientation • Spatial problem-solving, including use of strategies such as sequential assembly or trial and error, and ability to synthesize • Eye-hand coordination Low scores: • Poor motor control
CHC:	Gv (Visual Processing)
CLOSER source:	Explore this sweep in Discovery: MCS Age 7 Survey (2008).
Administration method:	Home interviewer; face to face; CM completes tasks and interviewer records outcome and timing on Computer-Assisted Personal Interview (CAPI).
Procedure:	The number of items administered during the assessment was dependent on the age of the child, and their performance during the assessment. All of the children in MCS4 started the assessment at Example C (item 8), which was the starting point appropriate for children of their age. For each, a pattern was presented to the child, and the child was asked to replicate the

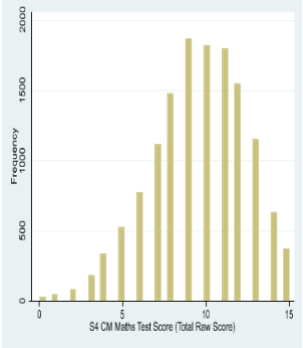
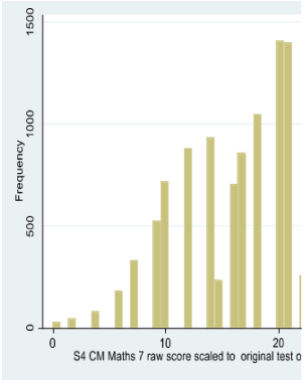
MCS4 (age 7 years; 2008): BAS II Pattern Construction	
	pattern using solid plastic cubes with black and yellow patterns on each side. On completion of each pattern, the interviewer coded whether or not the pattern was constructed correctly, and whether or not the pattern was constructed within the time limit. The patterns increased in complexity as the assessment progressed. Duration: 9-12 minutes (from data)
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/mcs4_cog_phys_documentation.pdf
Scoring:	Score is based on accuracy and speed. Starts at item 8 and first decision point at item 16.
Item-level variable(s):	• DCSCOR0H – DCSCOR0K (Items 8-11) • DCSCOR0L – DCSCOR0P (Items 12-16) • DCSCOR0Q – DCSCOR0W (Items 17-23) • DCSCOR0X – DCSCOR0Z (Items 24-26) • DCSCOR0A – DCSCOR0G (Items 1-7)
Total score/derived variable(s):	• DCTOTS00 (raw score- total number of correct responses) • DCPCAB00 (ability adjusted- total number of correct responses, accounting for the sets of items the CM was presented with, which depended on age and successful completion of blocks of items) • DCPCTS00 (ability and age adjusted on BAS II age normed data)
Descriptives:	DCTOTS00 (raw score): N = 13,703 Range = 0 - 72 Mean = 18.89 SD = 7.05  DCPCAB00 (ability adjusted): N = 13,703 Range = 10 - 211

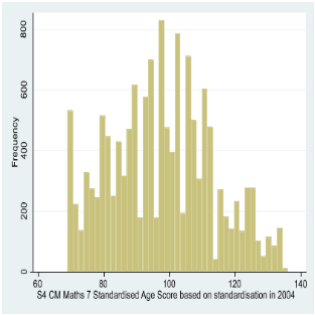
MCS4 (age 7 years; 2008): BAS II Pattern Construction	
	Mean = 116.13 SD = 17.25  DCPCTS00 (ability and age adjusted): N = 13,703 Range = 20 - 80 Mean = 52.99 SD = 11.08 
Age of participants (months):	Mean = 86.73, SD = 2.98, Range = 76 - 98
Other sweep and/or cohort:	• MCS (age 5) • ALSPAC (age 4 and 8.5) – Block Design
Source:	• Elliott, C. D., Smith, P., & McCulloch, K. (1996). British Ability Scales Second Edition (BAS II). Administration and Scoring Manual. London: Nelson. • Elliott, C. D., Smith, P., & McCulloch, K. (1997). British Ability Scales Second Edition (BAS II). Technical Manual. London: Nelson.
Technical resources:	• Chaplin Gray, J., Gatenby, R., Simmonds, N., & Huang, Y. (2010). Millennium Cohort Study Sweep 4: Technical Report (Second Edition). London: NatCen. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS4-technical-report-second-edition-September-2010_v2.pdf • Connelly, R. (2013). Interpreting Test Scores. Millennium

MCS4 (age 7 years; 2008): BAS II Pattern Construction	
	Cohort Study Data Note 2013/01. Centre for Longitudinal Studies: London. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS-data-note-20131-Test-Scores-Roxanne-Connelly.pdf
Example articles:	• Jones, E., Gutman, L., & Platt, L. (2013). Family stressors and children's outcomes. DfE Research Report DFE-RR254. London: Dept for Education. • Gilligan, K. A., Flouri, E., & Farran, E. K. (2017). The contribution of spatial ability to mathematics achievement in middle childhood. Journal of Experimental Child Psychology, 163, 107-125.

7.4.3 National Foundation for Educational Research (NFER) Progress in Maths (adapted)

MCS4 (age 7 years; 2008): NFER Progress in Maths (adapted)	
Domain:	Mathematical skills and knowledge
Measures:	Adaptation of the Progress in Maths 7 (PiM) test which was developed to assess mathematical ability. The child's mathematical skills and knowledge are tested by asking 20 questions covering topics such as numbers, shapes, measurement and data handling.
CHC:	Gq (Quantitative Knowledge)
CLOSER source:	Explore this sweep in Discovery: MCS Age 7 Survey (2008).
Administration method:	Home interviewer, face to face; verbal and child responds using pen and paper
Procedure:	The test is read aloud to the child and they are asked to complete a series of calculations in a paper and pencil exercise. The test was adapted from the NFER Progress in Maths test (Cres Fernandes, NFER). All CM's had to complete an initial test and based on their score they were routed to an easier, medium or harder section. An item response scaling method (Rasch) was used to scale the results of the easy, medium and hard subtest scores to the equivalent original raw scores.
Link to questionnaire:	https://cls.ucl.ac.uk/wp-content/uploads/2017/07/mcs4_cog_phys_documentation.pdf

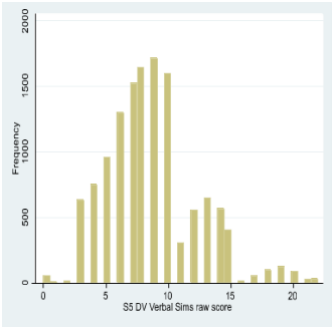
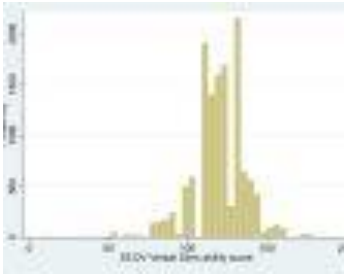
MCS4 (age 7 years; 2008): NFER Progress in Maths (adapted)	
Scoring:	Items 1 - 7 completed by all; then routed into easier, medium and harder. Items 2, 3, 4, 13 and 17 all scored 2 points, all other items scored 1 point.
Item-level variable(s):	• DMSCRE01 – DMSCRE20 (items) • DCMT_1_7 – DCMSCR_HRD (totals by sections e.g. 1-7 items)
Total score/derived variable(s):	• DCMTOTSCOR (raw score) • DCMATHS7SC (ability adjusted) • DCMATHS7SA (ability and age adjusted – look up tables 2004)
Descriptives:	DCMTOTSCOR (raw score): N = 13,756 Range = 0 - 15 Mean = 9.58 SD = 2.84  DCMATHS7SC (ability adjusted): N = 13,756 Range = 0 - 28 Mean = 18.38 SD = 5.84  DCMATHS7SA (ability and age adjusted): N = 13,756 Range = 69 - 136

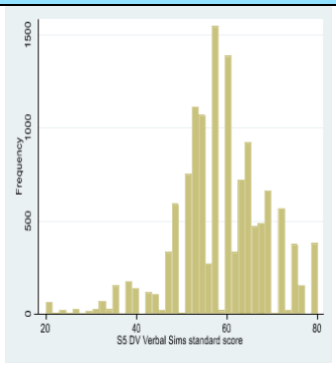
MCS4 (age 7 years; 2008): NFER Progress in Maths (adapted)	
	Mean = 97.65 SD = 15.72 
Age of participants (months):	Mean = 86.74, SD = 2.98, Range = 76 - 98
Other sweep and/or cohort:	None
Source:	Adapted version specifically for MCS (by Cres Fernandes) of NFER Progress in Maths test which is aimed for 7-year-olds and was originally developed and nationally UK standardised in 2004.
Technical resources:	• Chaplin Gray, J., Gatenby, R., Simmonds, N., & Huang, Y. (2010). Millennium Cohort Study Sweep 4: Technical Report (Second Edition). London: NatCen. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS4-technical-report-second-edition-September-2010_v2.pdf • Connelly, R. (2013). Interpreting Test Scores. Millennium Cohort Study Data Note 2013/01. Centre for Longitudinal Studies: London. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS-data-note-20131-Test-Scores-Roxanne-Connelly.pdf
Example articles:	• Jones, E & Schoon, I. (2010). Cognitive development. In Hansen, K, Jones, E, Joshi, H and Budge, D (ed), Millennium Cohort Study Fourth Survey: A User's Guide to Initial Findings. London: Centre for Longitudinal Studies. • Campbell, T. (2015). Stereotyped at seven? Biases in teacher judgement of pupils' ability and attainment. Journal of Social Policy, 44(3), 517-547.

7.5 MCS5 Age 11 years (2012)

7.5.1 British Ability Scales II (BAS II): Verbal Similarities

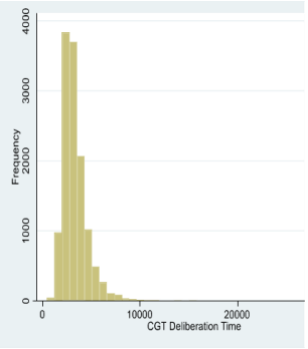
MCS5 (age 11 years; 2012): BAS II Verbal Similarities	
Domain:	Verbal (reasoning using verbal concepts)
Measures:	(Acquired) verbal knowledge and verbal reasoning: • Verbal reasoning ability • Expressive language skills, including verbal fluency • Vocabulary knowledge • General knowledge • Abstract and logical thinking • Ability to distinguish between essential and superficial features • Level of language stimulation
CHC:	Gc (Crystallised ability)
CLOSER source:	Explore this sweep in Discovery: MCS Age 11 Survey (2012).
Administration method:	Home interviewer using Computer-Assisted Personal Interview (CAPI), face to face; read to child, verbal response
Procedure:	Verbal Similarities was modified to be administered with the help of the CAPI programme. The general rule in BAS assessments is that the older the child the further into the assessment they start. As all of the cohort children were approximately the same age, they all started the assessment in the same place, at item 16, after completing Example A. The child was given three stimulus words and asked to name the class to which all the examples belong.
Link to questionnaire:	No direct link to pdf.
Scoring:	All items (except Example A) were scored 1 or 0 points. The assessment started at item 16 (age relevant start point). The test terminated at item 28, unless: • There were less than 3 incorrect responses. In this case, the test continued from item 29 to 33 • There were less than 3 correct answers. In this case, the test went back to item 8 to item 15 • There were 5 consecutive incorrect answers and less than 3 correct answers. In this case, the assessment would stop and go back to items 8 to 15. If items 8 to 16 were difficult, the

MCS5 (age 11 years; 2012): BAS II Verbal Similarities	
	test was routed back to item 1.
Item-level variable(s):	• ECQ01I00 – ECQ37I00 • LOW HIGH (base, ceiling)
Total score/derived variable(s):	• EVSRAW (raw score- total number of correct responses) • EVSABIL (ability adjusted- total number of correct responses, accounting for the sets of items the CM was presented with, which depended on age and successful completion of blocks of items) • EVSTSCO (ability and age adjusted)
Descriptives:	EVSRAW (raw score) N = 13,168 Range = 0 - 22 Mean = 8.66 SD = 3.64  EVSABIL (ability adjusted) N = 13,168 Range = 10 - 179 Mean = 120.60 SD = 17.11  EVSTSCO (ability and age adjusted) N = 13,168 Range = 20 - 80 Mean = 58.69 SD = 10.07

MCS5 (age 11 years; 2012): BAS II Verbal Similarities	
	
Age of participants (months):	Mean = 134.02, SD = 3.97, Range = 122 - 148
Other sweep and/or cohort:	• BCS70 (age 10) – BAS similarities (v1) • ALSPAC (age 8.5) – verbal similarities asked slightly differently • ALSPAC (age 4) – both verbal and picture similarities
Source:	Elliott, C. D., Smith, P., & McCulloch, K. (1996). British Ability Scales Second Edition (BAS II). Administration and Scoring Manual. London: Nelson.
Technical resources:	• Elliott, C. D., Smith, P. & McCulloch, K. (1997). British Ability Scales Second Edition (BAS II). Technical Manual. London: Nelson. • Gallop, K., Rose, R., Wallace, E., Williams, R., Cleary, A., Thompson, A., Burston, K., Frere-Smith, T., Dangerfield, P., & Tietz , S. Millennium Cohort Study Fifth Sweep (MCS5): Technical Report. London: Ipsos MORI. (pp. 38-41). https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS5-technical_report_FINAL.pdf • Connelly, R., Interpreting Test Scores. Millennium Cohort Study Data Note 2013/01. 2013, Centre for Longitudinal Studies: London. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS-data-note-20131-Test-Scores-Roxanne-Connelly.pdf
Example articles:	• Brown, M., & Sullivan, A. (2014). Cognitive Development. In PLATT, L (ed), Millennium Cohort Study: Initial findings from the Age 11 survey. London: Centre for Longitudinal Studies. • Barbuscia, A., & Mills, M. C. (2017). Cognitive development in children up to age 11 years born after ART—a longitudinal cohort study. Human Reproduction, 32(7), 1482-1488.

7.5.2 Cambridge Neuropsychological Test Automated Battery (CANTAB): Cambridge Gambling Task (CGT)

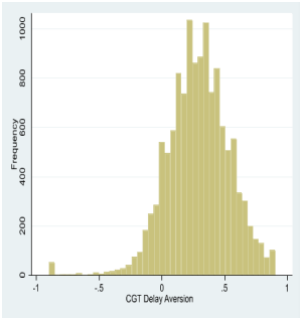
MCS5 (age 11 years; 2012): CANTAB Cambridge Gambling Task (CGT)	
Domain:	Executive function (decision making)
Measures:	The Cambridge Gambling Task was developed to assess decision making and risk-taking behaviour outside a learning context. It can be contrasted with widely used tests including the Balloon Analog Risk Taking Task (BART) and Iowa Gambling Task (IGT) in that the CGT asks participants to make bets under conditions of known risk, rather than ambiguity (e.g. Bechara, Damasio, Tranel & Damasio 2005; Lejuez et al., 2002). The test minimises learning, executive and working memory demands on participants, which can confound the interpretation of test scores. It also separates the decision-making - where participants choose what to bet on - from risk-taking, where participants decide how much then to bet on that choice. The test is recommended to assess cognitive function in: Attention deficit disorders, Depression and affective disorders, Obsessive compulsive disorder, Parkinson's disease, Schizophrenia and Traumatic brain injury.
CHC:	Gs (Processing Speed) Gt (Decision Speed/Reaction Time)
CLOSER source:	Explore this sweep in Discovery: MCS Age 11 Survey (2012)
Administration method:	Self-completion on Computer-Assisted Personal Interview (CAPI) tablet; using the CANTAB eclipse software which was integrated into the CAPI interview.
Procedure:	The participant was presented with a row of ten boxes across the top of the screen: some were red and some were blue. The ratio of red and blue boxes varied between stages but there was always one box that contained a yellow token hidden behind it. Participants used the 'Red' and 'Blue' buttons at the bottom of the screen to choose the box colour in which they thought the token was hidden. In the assessed stages, participants started with 100 points and selected a proportion of these points to bet on their decision. A

MCS5 (age 11 years; 2012): CANTAB Cambridge Gambling Task (CGT)	
	circle in the centre of the screen displayed the current bet value, which would either incrementally increase or decrease (depending on the task variant selected). Participants pressed this button when it showed the proportion of their score they would like to bet. These points were either added or taken away to their total score, depending on their decision and where the token was actually hidden. Duration: max 18 minutes
Link to questionnaire:	Documentation not available. For some additional detail, see: Cambridge Cognition web page on https://cambridgecognition.com/cambridge-gambling-task-cgt/
Scoring:	Raw data and procedures / algorithms for deriving the summary scores are unavailable. There are currently no normative scores.
Item-level variable(s):	Not readily available. There are additional variables available that outline any technical problems and test conditions.
Total score/derived variable(s):	• CGTTTIME (Test duration) • CGTDELAY (Delay aversion) • CGTDTIME (Deliberation time - milliseconds) • CGTOPBET (Overall proportional bet) • CGTQOFDM (Quality of decision making) • CGTRISKA (Risk adjustment) • CGTRISKT (Risk taking)
Descriptives:	CGTDTIME (deliberation time): N = 12,690 Range = 468 – 31978 Mean = 3331.12 SD = 1353.34  CGTDELAY (Delay aversion): N = 12,624

Range = -0.9 – 0.9

Mean = 0.29

SD = 0.25



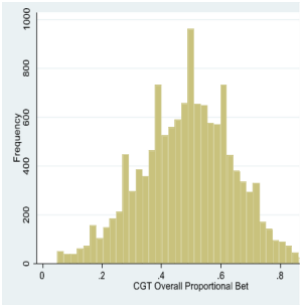
CGTOPBET (Overall proportional bet):

N = 12,689

Range = 0.05 – 0.95

Mean = 0.49

SD = 0.16



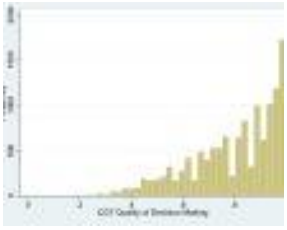
CGTQOFDM (Quality of decision making):

N = 12,690

Range = 0 - 1

Mean = 0.80

SD = 0.17



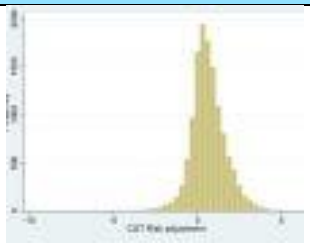
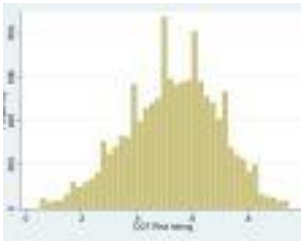
CGTRISKA (Risk adjustment):

N = 12,689

Range = -6.43 – 6.43

Mean = 0.65

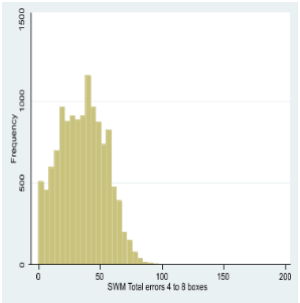
SD = 1.04

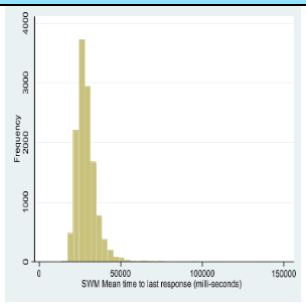
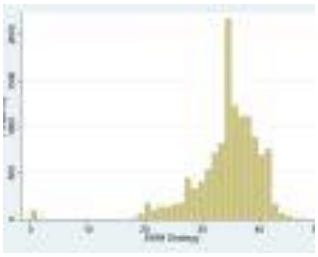
MCS5 (age 11 years; 2012): CANTAB Cambridge Gambling Task (CGT)	
	 CGTRISKT (Risk taking): N = 12,689 Range = 0.05 – 0.95 Mean = 0.53 SD = 0.17 
Age of participants (months):	Mean = 134, SD = 3.95, Range = 122 - 148
Other sweep and/or cohort:	• MCS (age 14)
Source:	Cambridge Cognition. CANTAB (Cambridge Neuropsychological Test Automated Battery) - Cognitive Assessment Software. Available at https://cambridgecognition.com/cognitive-function/
Technical resources:	• Atkinson, M. (2015). Millennium Cohort Study Interpreting the CANTAB Cognitive Measures. London, UK: Centre for Longitudinal Studies, Institute of Education, University of London. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/mcs5_cantab_assessments_data_note.pdf • Hansen K, ed. (2014). Millennium Cohort Study, A Guide to the Datasets (Eighth Edition) - First, Second, Third, Fourth and Fifth Surveys. London, UK: Centre for Longitudinal Studies, Institute of Education, University of London https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS-Guide-to-the-Datasets-022014.pdf
Example articles:	• Brown, M & Sullivan, A. (2014). Cognitive Development. In PLATT, L (ed), Millennium Cohort Study: Initial findings from

MCS5 (age 11 years; 2012): CANTAB Cambridge Gambling Task (CGT)	
	the Age 11 survey. London: Centre for Longitudinal Studies. • Flouri, E., Ioakeimidi, S., Midouhas, E., & Ploubidis, G. B. (2017). Maternal psychological distress and child decision-making. Journal of Affective Disorders, 218, 35-40. • Flouri, E., Moulton, V., & Ploubidis, G. B. (2018). The role of intelligence in decision-making in early adolescence. British Journal of Developmental Psychology.

7.5.3 CANTAB: Spatial Working Memory Task (SWM)

MCS5 (age 11 years; 2012): CANTAB Spatial Working Memory Task (SWM)	
Domain:	Memory (holding and manipulating information)
Measures:	The test measures Spatial Working Memory, which requires retention and manipulation of visuospatial information. It has notable executive function demands and provides a measure of strategy as well as working memory errors. The test is recommended to assess cognitive function in: Alzheimer's disease, autism spectrum disorder, depression and affective disorders, Down's syndrome, epilepsy, multiple sclerosis, Parkinson's disease, schizophrenia, stroke and cerebrovascular disease, and traumatic brain injury.
CHC:	Gsm (Short-Term memory)
CLOSER source:	Explore this sweep in Discovery: MCS Age 11 Survey (2012)
Administration method:	Self-completion on Computer-Assisted Personal Interview (CAPI) tablet; using the CANTAB eclipse software which was integrated into the CAPI interview.
Procedure:	The test began with a number of coloured squares (boxes) shown on the screen. By selecting the boxes and using a process of elimination, the participant should have found one yellow 'token' in each of a number of boxes and used them to fill up an empty column on the right-hand side of the screen. Depending on the difficulty level used for this test, the number of boxes could be gradually increased until a maximum of 12 boxes were shown for the participants to search. The colour and position of the boxes used were changed from trial to trial to discourage the use of stereotyped search strategies.

MCS5 (age 11 years; 2012): CANTAB Spatial Working Memory Task (SWM)	
	Duration: max 18 minutes
Link to questionnaire:	Documentation not available. For some additional detail, see: https://cambridgecognition.com/spatial-working-memory-swm/
Scoring:	Key outcomes of the test were: • total errors • time taken until last response • strategy Raw data and procedures / algorithms for deriving the summary scores are unavailable.
Item-level variable(s):	SWMTTIME – SWMWE8BX
Total score/derived variable(s):	Key Item-level variable(s): • SWMTE8BX (Total errors on 4,6 and 8 box trials) • SWMMTTLR (Mean time to last response) • SWMSTRAT (Overall degree to which searches employ sequential heuristic)
Descriptives:	SWMTE8BX (Total errors on 4, 6, and 8 box trials): N = 12,757 Range = 0 - 173 Mean = 35.71 SD = 18.76  SWMMTTLR (Mean time to last response): N = 12,637 Range = 10591 - 153037 Mean = 28922.07 SD = 6309.03

MCS5 (age 11 years; 2012): CANTAB Spatial Working Memory Task (SWM)	
	 SWMSTRAT (Strategy): N = 12,757 Range = 0 - 48 Mean = 34.32 SD = 5.94 
Age of participants (months):	Mean = 134, SD = 3.95, Range = 122 - 148
Other sweep and/or cohort:	None
Source:	Cambridge Cognition. CANTAB (Cambridge Neuropsychological Test Automated Battery) - Cognitive Assessment Software. Available at https://cambridgecognition.com/cognitive-function/
Technical resources:	• Atkinson, M. (2015). Millennium Cohort Study Interpreting the CANTAB Cognitive Measures. London, UK: Centre for Longitudinal Studies, Institute of Education, University of London. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/mcs5_cantab_assessments_data_note.pdf • Hansen K, ed. (2014). Millennium Cohort Study , A Guide to the Datasets (Eighth Edition) - First, Second, Third, Fourth and Fifth Surveys. London, UK: Centre for Longitudinal Studies, Institute of Education, University of London https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS-Guide-to-the-Datasets-022014.pdf

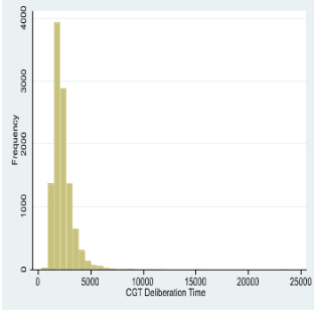
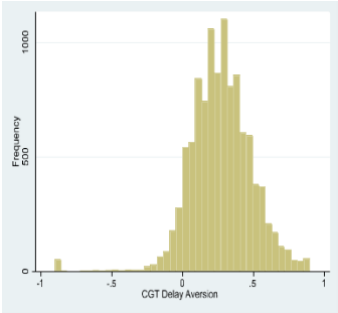
MCS5 (age 11 years; 2012): CANTAB Spatial Working Memory Task (SWM)	
Example articles:	• Brown, M & Sullivan, A. (2014). Cognitive Development. In Platt, L (ed), Millennium Cohort Study: Initial findings from the Age 11 survey. London: Centre for Longitudinal Studies. • Fitzpatrick, A., Carter, J., & Quigley, M. A. (2016). Association of gestational age with verbal ability and spatial working memory at age 11. Pediatrics, e20160578. • Flouri, E., Papachristou, E., & Midouhas, E. (2018). The role of neighbourhood greenspace in children's spatial working memory. British Journal of Educational Psychology, 89, 359-373.

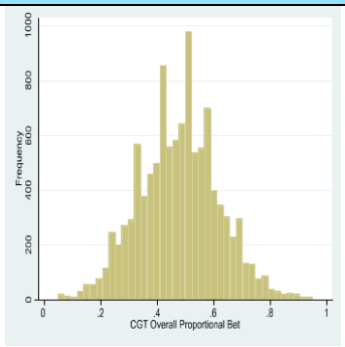
7.6 MCS6 Age 14 years (2015)

7.6.1 Cambridge Neuropsychological Test Automated Battery (CANTAB): Cambridge Gambling Task (CGT)

MCS6 (age 14 years; 2015): CANTAB Cambridge Gambling Task (CGT)	
Domain:	Executive function (decision making)
Measures:	The Cambridge Gambling Task was developed to assess decision making and risk-taking behaviour outside a learning context. It can be contrasted with widely used tests including the Balloon Analog Risk Taking Task (BART) and Iowa Gambling Task (IGT) in that the CGT asks participants to make bets under conditions of known risk, rather than ambiguity (e.g. Bechara, Damasio, Tranel & Damasio 2005; Lejuez et al., 2002). The test minimises learning, executive and working memory demands on participants, which can confound the interpretation of test scores. It also separates the decision-making - where participants choose what to bet on - from risk-taking, where participants decide how much then to bet on that choice. The test is recommended to assess cognitive function in: Attention deficit disorders, Depression and affective disorders, Obsessive compulsive disorder, Parkinson's disease, Schizophrenia and Traumatic brain injury.
CHC:	Gs (Processing Speed) Gt (Decision Speed/Reaction Time)

MCS6 (age 14 years; 2015): CANTAB Cambridge Gambling Task (CGT)	
CLOSER source:	Explore this sweep in Discovery: MCS Age 14 Survey (2015).
Administration method:	Self-completion on Computer-Assisted Personal Interview (CAPI) tablet; using the CANTAB eclipse software which was integrated into the CAPI interview.
Procedure:	The participant was presented with a row of ten boxes across the top of the screen: some were red and some are blue. The ratio of red and blue boxes varied between stages but there was always one box that contained a yellow token. Participants used the 'Red' and 'Blue' buttons at the bottom of the screen to choose the box colour in which they thought the token was hidden. In the assessed stages, participants started with 100 points and selected a proportion of these points to bet on their decision. A circle in the centre of the screen displayed the current bet value, which would either incrementally increase or decrease (depending on the task variant selected). Participants pressed this button when it showed the proportion of their score they would like to bet. These points were either added or taken away to their total score, depending on their decision and where the token was actually hidden. Duration: max 18 minutes
Link to questionnaire:	Documentation not available. For some additional detail, see: Cambridge Cognition web page on Cambridge Gambling Task https://cambridgecognition.com/cambridge-gambling-task-cgt/
Scoring:	Raw data and procedures / algorithms for deriving the summary scores are unavailable. There are currently no normative scores.
Item-level variable(s):	• FCGTOUTCM (outcome of test) • Other item-level variables not readily available. • There are also no additional variables available outlining any technical problems. • Test conditions variables are contained in data file "mcs6_cm_assessment" from UK Data Service
Total score/derived variable(s):	• FCGTTTIME (Test duration) • FCGTDELAY (Delay aversion) • FCGTDTIME (Deliberation time - milliseconds) • FCGTOPBET (Overall proportional bet) • FCGTQOFDM (Quality of decision making)

MCS6 (age 14 years; 2015): CANTAB Cambridge Gambling Task (CGT)	
	• FCGTRISKA (Risk adjustment) • FCGTRISKT (Risk taking)
Descriptives:	FCGTDTIME (Deliberation time) N = 10,854 Range = 362 - 23691 Mean = 2336.53 SD = 944.16  FCGTDELAY (Delay aversion) N = 10,848 Range = -0.9 – 0.9 Mean = 0.27 SD = 0.22  FCGTOPBET (Overall proportional bet) N = 10,848 Range = 0.05 – 0.95 Mean = 0.48 SD = 0.14



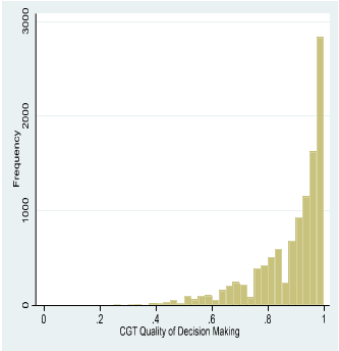
FCGTQOFDM (Quality of decision making)

N = 10,854

Range = 0 – 1

Mean = 0.88

SD = 0.13



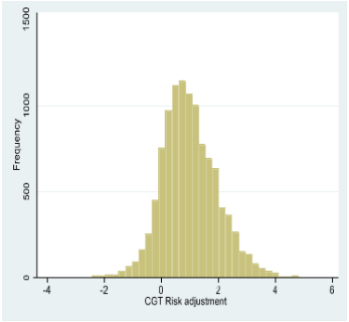
FCGTRISKA (Risk adjustment)

N = 10,853

Range = -4.06 – 5.28

Mean = 0.99

SD = 0.98



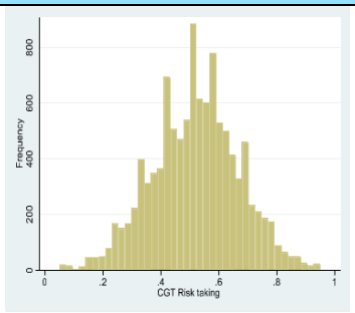
FCGTRISKT (Risk taking)

N = 10,853

Range = 0.05 – 0.95

Mean = 0.52

SD = 0.15

MCS6 (age 14 years; 2015): CANTAB Cambridge Gambling Task (CGT)	
	
Age of participants (months):	Mean = 171, SD = 4.05, Range = 158 - 184
Other sweep and/or cohort:	• MCS (age 11)
Source:	Cambridge Cognition. CANTAB (Cambridge Neuropsychological Test Automated Battery) - Cognitive Assessment Software. Available at: Cambridge Cognition web page on cognitive functionhttps://cambridgecognition.com/cognitive-function/
Technical resources:	• Atkinson, M. (2015). Millennium Cohort Study Interpreting the CANTAB Cognitive Measures. London, UK: Centre for Longitudinal Studies, Institute of Education, University of London. https://cls.ucl.ac.uk/wp-content/uploads/2017/07/mcs5_cantab_assessments_data_note.pdf https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS-Guide-to-the-Datasets-022014.pdf • Ipsos MORI. (2017). Millennium Cohort Study Sixth Sweep (MCS6) Technical Report (Version 2). London, UK: Ipsos MORI Social Research Institute. https://cls.ucl.ac.uk/wp-content/uploads/2017/12/MCS6-Technical-Report.pdf • Fitzsimons, E. (2020). Millennium Cohort Study Sixth Survey 2015-2016 User Guide (Second Edition). London UK: Centre for Longitudinal Studies, University College London. https://cls.ucl.ac.uk/wp-content/uploads/2020/09/MCS6_User_Guide_ed2_2020-08-10.pdf
Example articles:	• Creese, H., Viner, R., Hope, S., & Christie, D. (2018). Obesity and cognition during childhood: Findings from the Millennium Cohort Study: Hanna Creese. European Journal of Public Health, 28(suppl_4), cky213-260.

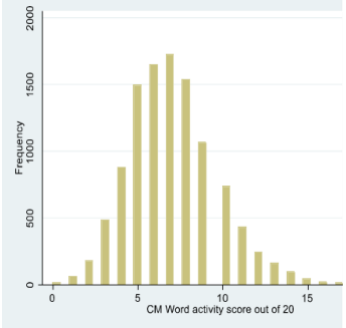
7.6.2 APU (Applied Psychology Unit) Vocabulary Test

MCS6 (age 14 years; 2015): APU Vocabulary Test (Word Activity)	
Domain:	Verbal (vocabulary)
Measures:	• Vocabulary • Understanding of the meaning of words • Word knowledge The test was a shortened version of 20 items from the full test (75 items) used in the BCS70 at age 16.
CHC:	Gc (Crystallised ability)
CLOSER source:	Explore this sweep in Discovery: MCS Age 14 Survey (2015).
Administration method:	Computer-Assisted Personal Interview (CAPI): CM's selected their answer by touching the word on the screen with their index finger. If they changed their mind, they could deselect the word in the same way.
Procedure:	20 words in the test. Each word was followed by a multiple-choice list of 5 words from which the respondent picked the word with the same meaning as the original word. The test got progressively harder. In addition, the task was timed, 4 minutes was allowed and a warning was displayed on screen with one minute remaining and countdown from 60 seconds was shown. The task was completed by the CM, main parent and partner. Different sets of words were used for each, with the same level of difficulty. Duration: 4 minutes
Link to questionnaire:	Not available.
Scoring:	20 items; 1 point for each correct response, 0 for incorrect or not attempted
Item-level variable(s):	• FCCMCOGA – FCCMCOGT (CM item response) • FPMCOG0A – FPMCOG0T (MAIN parent item response) • FPPCOG0A – FPPCOG0T (PARTNER item response)
Total score/derived variable(s):	• FCWRDSC (Total raw score CM) • FPWRDSCM (Total raw score MAIN PARENT) • FPWRDSCP (Total raw score PARTNER)
Descriptives:	FCWRDSC (Total raw score CM): N = 10,921

Range = 0 - 19

Mean = 7.06

SD = 2.62



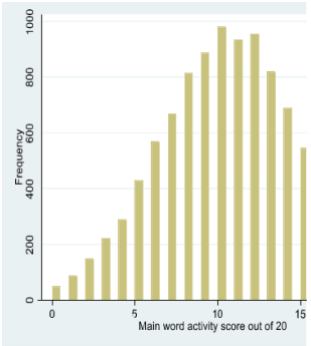
FPWRDSCM (Total raw score MAIN PARENT):

N = 11,057

Range = 0 - 20

Mean = 10.97

SD = 4.40



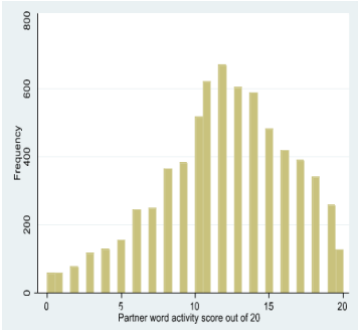
FPWRDSCP (Total raw score PARTNER):

N = 6,869

Range = 0 - 20

Mean = 11.91

SD = 4.40



Age of participants	• Mean = 171, SD = 4.06, Range = 157 - 184 (CM months) • Mean = 43.49, SD = 5.98, Range = 20 - 74 (MAIN PARENT years)

MCS6 (age 14 years; 2015): APU Vocabulary Test (Word Activity)	
(months):	• Mean = 46.09, SD = 6.54, Range = 19 - 81 (PARTNER years)
Other sweep and/or cohort:	• BCS70 (age 16) • BCS70 (age 42) – shortened version (20 items)
Source:	Shortened version (20 of original 75 items) of Closs, S. J. (1976). *APU vocabulary test (multiple choice format, 1986)*. Kent: Hodder and Stoughton Educational Ltd.
Technical resources:	• Levy, P. & Goldstein, H. (1984). Tests in Education: a book of critical reviews. London: Academic Press. • Ipsos MORI. (2017). Millennium Cohort Study Sixth Sweep (MCS6) Technical Report (Version 2). London, UK: Ipsos MORI Social Research Institute. https://cls.ucl.ac.uk/wp-content/uploads/2017/12/MCS6-Technical-Report.pdf • Fitzsimons, E. (2020). Millennium Cohort Study Sixth Survey 2015-2016 User Guide (Second Edition). London UK: Centre for Longitudinal Studies, University College London. https://cls.ucl.ac.uk/wp-content/uploads/2020/09/MCS6_User_Guide_ed2_2020-08-10.pdf
Example articles:	• Hoffmann, N. I. (2018). Cognitive achievement of children of immigrants: Evidence from the Millennium Cohort Study and the 1970 British Cohort Study. *British Educational Research Journal*, *44*(6), 1005-1028. • Sullivan, A., Moulton. V & Fitzsimons, E. (2018). The intergenerational transmission of vocabulary. CLS Working Paper, Institute of Education, London.

7.7 MCS7 Age 17 years (2018)

7.7.1 Number Analogies

MCS7 (age 17 years; 2018): Number Analogies	
Domain:	Quantitative reasoning
Measures:	• Basic arithmetic knowledge • Reasoning with numbers The test was the shortened version of the Number Analogies Test in the Quantitative Reasoning Battery of

MCS7 (age 17 years; 2018): Number Analogies	
	the GL-assessments' 20-item Cognitive Abilities Test 3 (CAT3), Level H, used with permission of the owners GL-assessments (© David F Lohman, Robert L Thorndike, Elizabeth P Hagen, 2001)
CHC:	Gf (Fluid reasoning) Gq (Quantitative knowledge)
CLOSER source:	Not currently available in CLOSER Discovery
Administration method:	During the Young Person Interview which was a Computer-Assisted Personal Interview (CAPI). CM presented with a booklet containing the questions and were provided with pencil and paper if needed to work out answers.
Procedure:	CM had 6 minutes to complete 10 questions in the booklet. In each question, CM was presented with 3 pairs of numbers. They had to work out the relationship between numbers and then complete the third pair by selecting the answer from five options. They were given pen and paper if needed. Before the actual test, cohort members were shown practice questions, which could be repeated as many times as needed. If CM member finished the test early, they were asked to review the answers until the time was up. If CM had a learning disability, serious behavioural problem or couldn't respond in the required manner, they were not administered the test.

MCS7 (age 17 years; 2018): Number Analogies	
Link to questionnaire:	Not available.
Scoring:	The CM's answer from the five options was noted (e.g. option A, B, C, D or E); there was one correct answer per question. No further coding was carried out on the data.
Item-level variable(s):	• GCNAEX00 (example questions) • GCNAEG1, GCNAEG2, GCNAEG3 (practice questions) • GCNAAS0A, GCNAAS0B, GCNAAS0C, GCNAAS0D, GCNAAS0E, GCNAAS0F, GCNAAS0G, GCNAAS0H, GCNAAS0I, GCNAAS0J (test questions)
Total score/derived variable(s):	None
Descriptives:	N = 9540
Age of participants (years):	Mean = 17.16, SD = 0.42, Range = 16.1 – 18.3
Other sweep and/or cohort:	None
Source:	Documentation for the CAT3 is not available, but documentation is available for CAT4: GL Assessment. (n.d.). Cognitive Abilities Test (CAT4) Support. https://support.gl-assessment.co.uk/knowledge-base/assessments/cat4-support/
Technical resources:	• Fitzsimons, E., Haselden, L., Smith, K., Gilbert, E., Calderwood, L., Agalioti-Sgompou, V., Veeravalli, S.,

MCS7 (age 17 years; 2018): Number Analogies	
	Silverwood, R., Ploubidis, G. (2020) Millennium Cohort Study Age 17 Sweep (MCS7): User Guide. London: UCL Centre for Longitudinal Studies. https://cls.ucl.ac.uk/wp-content/uploads/2022/05/MCS7-user-guide-Age-17-ed2.pdf • Ipsos MORI. (2019) Millennium Cohort Study Seventh Sweep (MCS7) Technical Report. London: Ipsos MORI. https://cls.ucl.ac.uk/wp-content/uploads/2020/01/MCS7_Technical_Report.pdf • *Documentation for the CAT3 is not available, but documentation is available for CAT4:* GL Assessment. (n.d.). Cognitive Abilities Test (CAT4): Technical Report – UK & Ireland Edition. https://support.gl-assessment.co.uk/media/2794/cat4-uk-technical-report.pdf
Example articles:	• Adjei, N. K. et al. (2024). Impact of Parental Mental Health and Poverty on the Health of the Next Generation: A Multi-Trajectory Analysis Using the UK Millennium Cohort Study. Journal of Adolescent Health, Volume 74, Issue 1, pages 60 – 70. https://doi.org/10.1016/j.jadohealth.2023.07.029

7.8 MCS8 Age 23 years (2023)

Data collection is ongoing and data is expected to be released in late 2025 via the UK Data Service. Cognitive measurements aim to assess short-term memory, attention and processing speed.

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