

C-COSI

Children's Cognitive screening Instrument

Administration and Scoring Manual v1.2



Contents

1 Introduction	4
Why do we need Brief Screens	4
C-COSI Test Structure	4
C-COSI Subtest Overview	5
2 Development and Standardisation	6
Item Development	6
Standardisation and Clinical Validity	6
<i>Stage 1: Normative Data with Healthy Controls</i>	6
<i>Stage 2: Preliminary Validity with a Clinical Population</i>	11
<i>Stage 3: Optimising clinical cut-offs</i>	14
3 C-COSI: Administration and Scoring	17
Overview of C-COSI Administration	17
<i>Age Range and Target Population</i>	17
<i>C-COSI Materials</i>	17
<i>General Administration</i>	17
<i>Starting Points, Reversal and Discontinuation Rules</i>	18
<i>Completing the Front Sheet</i>	18
<i>Calculating the Index Scores</i>	18
Screen	20
3.1 Orientation	21
3.2 Language Comprehension	22
3.3 Registration	24
3.4 Sequences	26
3.5 Auditory Attention	27
3.6 Phonemic Fluency	30
3.7 Semantic Fluency	32
3.8 Delayed Memory	34
3.9 Immediate Memory	36
3.10 Visual Memory	38
3.11 Language Production	39
3.12 Verbal Comprehension	41
3.13 Naming	42
3.14 Semantic Knowledge	43
3.15 Reading	44

3.16 Picture Copying	45
3.17 Jigsaw Cancellation	47
3.18 Dot Counting	49
3.19 Silhouettes	50
3.20 Delayed Memory II	51
3.21 Visual delayed Memory	53
4 eC-COSI: Administration and Scoring	54
<i>Development of the eC-COSI</i>	54
<i>Age Range and Target Population</i>	56
<i>eC-COSI Materials</i>	56
<i>General Administration</i>	56
<i>Tele-assessment Guidance</i>	56
Screen	57
4.1 Orientation	58
4.2 Language Comprehension	59
4.3 Registration	61
4.4 Sequences	63
4.5 Auditory Attention	64
4.6 Phonemic Fluency	67
4.7 Semantic Fluency	69
4.8 Delayed Memory	71
4.9 Immediate Memory	73
4.10 Visual Memory	75
4.11 Language Production	76
4.12 Verbal Comprehension	78
4.13 Naming	79
4.14 Semantic Knowledge	80
4.15 Reading	81
4.16 Picture Copying	82
4.17 Jigsaw Cancellation	84
4.18 Dot Counting	86
4.19 Silhouettes	87
4.20 Delayed Memory II	88
4.21 Visual delayed Memory	90
References	91

1

Introduction

The children's cognitive screening instrument (C-COSI) is a brief screening tool designed to detect potential cognitive impairment in children aged 5 years 0 months to 16 years 11 months following an acquired brain injury (ABI).

Two forms of the C-COSI have been developed to account for the typical progression in cognitive abilities that take place as children age (Bornholt et al., 2010). The C-COSI-Y (Children's cognitive screening instrument-youth) is designed for children aged 5 years 0 months to 11 years 11 months while the C-COSI-A (Children's cognitive screening instrument-adolescent) is designed for children aged 12 years 0 months to 16 years 11 months.

This manual contains all the information needed to perform standard test administration. Chapter 1 provides a brief overview of the C-COSI focussing on the rationale, test structure and application. The development and standardisation of the C-COSI is covered in chapter 2. Detailed instructions on how to administer and score the C-COSI are provided in chapter 3. Chapter 4 provided details on the electronic version of the C-COSI (eC-COSI) and how it is administered.

Why do we need Brief Screens

Difficulties in domains of cognition such as attention, language and memory are often observed following a traumatic brain injury (TBI). It is common within adult neuropsychology services to first use a cognitive screening tool following a TBI. While these screening tools are unable to definitively determine whether an individual has a deficit in any cognitive domain, they are incredibly useful in helping to quickly determine whether an individual needs further neuropsychological assessment if any concerns are flagged in turn improving resource efficiency (Diaz-Asper et al., 2024).

While cognitive screening tools are commonplace in adult neuropsychology, they are not within paediatric neuropsychology services. Instead, identification of deficits in cognitive domains follow a resource intensive model where young people engage in a time-consuming cognitive assessment. This can delay the identification of difficulties with cognition and lead to poorer outcomes (Rasquin et al., 2011). To date, very few paediatric cognitive screeners exist.

C-COSI Test Structure

The C-COSI-Y and C-COSI-A are composed of 21 short subtests as well as two screening questions at the beginning. Scores are combined to obtain index scores for domains of attention, fluency, memory, language and visuospatial skills (table 1.1). The total score is calculated by summing the number of domains which class an individual as impaired. Further information can be found in chapter 3.

C-COSI Subtest Overview

The 21 subtests altogether take approximately 13 to 16 minutes to administer and are designed to briefly screen impairment in the five domains (table 1.2). Subtests are ordered to allow the administrator to first establish a child's level of language comprehension and basic orientation.

Table 1.1
C-COSI Indexes

Index	Domain Measured
Attention	Index score of attention across subtests
Fluency	Index score of verbal fluency across subtests
Memory	Index score of immediate and delayed memory across subtests
Language	Index score of linguistic abilities across subtests
Visuospatial skills	Index score of visuospatial skills across subtest.

Table 1.2
C-COSI Subtest and Index Structure

Subtest	Index				
	Attention	Fluency	Memory	Language	Visuospatial
Orientation	X				
Language Comprehension				X	
Registration	X				
Sequences	X				
Auditory Attention	X				
Phonemic Fluency		X			
Semantic Fluency		X			
Delayed Memory			X		
Immediate Memory			X		
Visual Memory			X		
Language Production				X	
Verbal Comprehension				X	
Naming				X	
Semantic Knowledge				X	
Reading				X	
Picture Copying					X
Jigsaw Cancellation					X
Dot Counting					X
Silhouettes					X
Delayed Memory			X		
Visual Delayed Memory			X		

2

Development and Standardisation

This chapter discusses how the C-COSI was developed and the research that led to its standardisation in typically developing and clinical populations.

Item Development

The first stage in the development of the C-COSI was an in-depth literature review of current cognitive screening tests used in adult and paediatric neuropsychology services. This literature review, combined with specialist knowledge from the research team, allowed for the items on the C-COSI to be developed considering age, clinical utility, gender and socioeconomic factors.

The structure of the C-CoSI was designed around the structure of Addenbrooks Cognitive Examination: 3rd Edition (ACE-III; (Mathuranath et al., 2000)) and draws some influence from the Mini-Mental State Examination (MMSE; (Folstein et al., 1975)). It was felt by the research team that the subtest order of the C-CoSI should be done in such a way to prioritise establishing a child's level of language comprehension and basic orientation first.

Two version of the C-COSI were developed to reflect the rapid cognitive development that occurs in young children as the brain matures (Toga et al., 2006). These are the C-COSI-Y (for ages 5y0m -11y11m) and C-COSI-A (12y0M – 16y11m). This enabled the C-CoSI to be sensitive to the typical progression of cognitive abilities as children age (Bornholt et al., 2010).

Standardisation and Clinical Validity

Stage 1: Normative Data with Healthy Controls

Marsh et al. (2016) collected normative data collected from May to July 2015 using a sample of healthy participants. Data was collected in two locations: At-Bristol and A school in Oxfordshire.

Demographic Characteristics

Normative data was collected from a selection of healthy participants between ages 5y0m and 16y11m. To be eligible for the study, participants had to be in full time education, be fluent in English, and have no history of neurological damage, mental illness, special educational needs and/or developmental disorders.

The final sample included 240 participants and included participants from 11 age groups: 5 years, 6 years, 7 years, 8 years, 9 years, 10 years, 11 years, 12, years, 13 years, 14 years and 15 years. Unfortunately, it was not possible to collect data from participants aged 16 years. Table 2.1 shows the demographic characteristics of this sample.

*Table 2.1
Demographics Characteristics for the healthy sample used for normative data*

Location	Age (years)		Handedness (right:left)	Gender (female:male)
	M (SD)	Range		
Bristol Museum (n=142)	8.45 (2.00)	5.00 – 11.91	118:24	78:63
Oxford School (n=98)	13.73 (1.31)	12.00 - 15.75	83:15	60:38
Total Control (n=240)	10.60 (3.13)	5.00 - 15.75	201:39	138:102

Normative Data

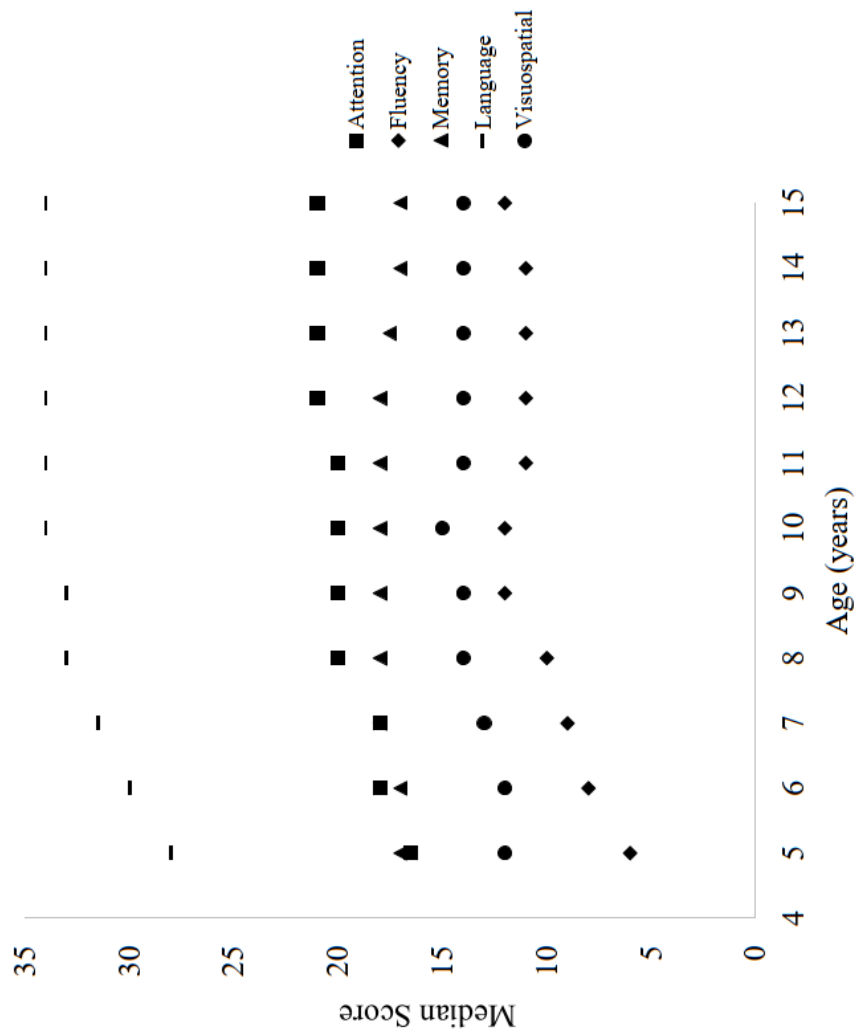
Initial analysis conducted using Kolmogorov-Smirnov tests for normality showed that both forms of the C-COSI deviated significantly from normality. Table 2.2. shows that further correlational analysis identified that age was significantly positively correlated with scores on all domains of the C-COSI-Y with older children scoring higher scores. This trend was not seen for all domains of the C-COSI-A

As age was not found to be significantly associated with most domains on the C-COSI-A, age-based cut-off values were only calculated for the C-COSI-Y. Figures 2.1 and 2.2. illustrate that there was little difference in the median domain score and distribution between children aged 8y0m to 9y11m 10y0m to 11y11m and 12y0m to 15y11m for most domains. Therefore, normative data and cut-off values are defined for the following groups: 5 (n = 18), 6 (n = 21), 7 (n = 20), 8 – 9 (n = 41), 10 – 11 (N =41) and 12y0m – 15y11m (n = 98).

*Table 2.2
Correlation between age and domain scores on the C-COSI-Y and C-COSI-A*

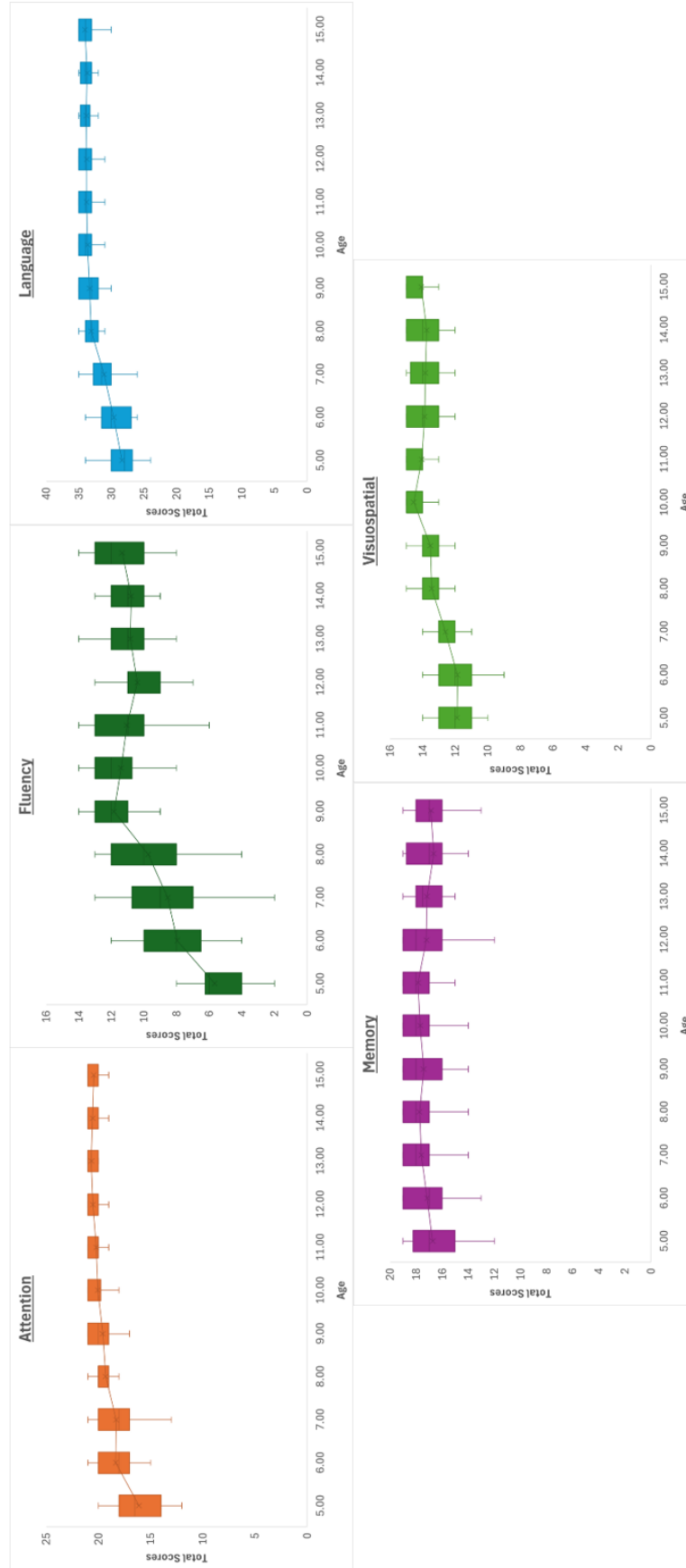
Domain	Age	
	CCoSI-Y	CCoSI-A
Attention	.58***	-.04
Fluency	.62***	.30**
Memory	.15*	-.18*
Language	.66***	.13
Visuospatial	.62***	.10

Figure 2.1
Median scores on each C-COSI domain for each age.



Note: Values reported for 12 – 15-year-olds are for scores on the C-COSI-A and cannot be directly compared to all other ages, who completed the C-COSI-Y. Scores on each

Figure 2.2
Distribution of scores for each domain of the C-COSI per age group



Note: Values reported for 12 – 15-year-olds are for scores on the C-COSI-A and cannot be directly compared to all other ages, who completed the C-COSI-Y. Scores on each test form should be treated uniquely

Table 2.3
Cut-offs for each domain of the C-COSI for each age group.

	Age	Mean (SD)	5 th percentile	10 th percentile	15 th percentile
Attention	5	16.11 (2.32)	12.00	12.90	13.00
	6	18.33 (1.50)	15.10	16.20	17.00
	7	18.30 (2.08)	13.15	16.00	16.00
	8-9	19.43 (1.27)	17.00	17.30	18.00
	10-11	20.12 (0.87)	18.10	19.00	19.00
	12-15	20.52 (0.66)	19.00	19.00	20.00
Fluency	5	5.67 (1.53)	2.00	3.80	4.00
	6	7.95 (2.31)	4.00	4.20	5.30
	7	8.55 (2.96)	2.05	3.30	6.00
	8-9	10.69 (2.32)	5.15	8.00	8.00
	10-11	11.24 (2.17)	6.10	8.00	9.00
	12-15	10.72 (1.72)	8.00	8.00	9.00
Memory	5	16.72 (0.47)	12.00	13.80	14.85
	6	17.19 (1.69)	13.20	15.20	16.00
	7	17.60 (1.90)	12.10	14.10	15.30
	8-9	17.60 (1.56)	14.00	16.00	16.00
	10-11	17.76 (1.32)	15.00	15.20	16.00
	12-15	16.99 (1.88)	13.00	14.90	15.00
Language	5	28.39 (2.68)	24.00	24.00	24.85
	6	29.62 (2.64)	26.00	26.00	26.30
	7	31.10 (2.13)	26.05	27.20	29.15
	8-9	33.19 (1.66)	30.15	31.00	31.45
	10-11	33.71 (1.44)	31.00	32.00	33.00
	12-15	33.84 (1.11)	32.00	32.00	33.00
Visuospatial	5	11.89 (1.71)	7.00	9.70	10.00
	6	11.85 (1.53)	0.10	10.00	10.00
	7	12.60 (1.16)	10.05	11.00	11.00
	8-9	13.48 (1.06)	11.15	12.00	12.00
	10-11	14.32 (0.09)	13.00	13.00	14.00
	12-15	13.50 (0.99)	12.00	12.00	13.00

As the distributions of scores violated normality, cut-offs values were calculated for the 5th, 10th and 15th percentile. These are presented in table 2.3.

Stage 2: Preliminary Validity with a Clinical Population

Marsh et al. (2016) also collected data from a selection of patients at Bristol Royal Hospital for Children at the same time as normative data with healthy participants was collected. This was used to validate cut-offs presented in table 2.3 and compare the clinical validity of the cut offs calculated using scores in the 5th, 10th and 15th percentile of the C-COSI.

Demographic Characteristics

Clinical data was obtained from patient participants who had seen the neuropsychology department at Bristol Royal Hospital for Children. Patients were only included if they had acquired a brain injury or had a suspected/confirmed neurological condition leading to acute admission. Patient, aged 5y0m – 16y11m, were not included if they had progressive neurological condition. To be eligible for the study, participants had to be in full time education, be fluent in English, and have no history of neurological damage, mental illness, special educational needs and/or developmental disorders.

The final sample included 8 patients from 6 age groups: 6 years, 8 years, 9 years, 11 years, 14 years and 15 years. Due to the small sample size, it was not possible to obtain data from participants aged 5 years, 7 years, 10 years, 12 years, 13 years and 16 years. Table 2.4 shows the demographic characteristics of this patient group.

Table 2.4
Demographic Characteristics of the patient sample during preliminary clinical validation

Age (years)		Handedness (right:left)	Gender (female:male)	Diagnosis
M (SD)	Range			
11.48 (4.10)	6.50 – 15.58	8:0	3:5	Epilepsy (n = 2) Asymmetric ventriculomegaly (n = 1) Periventricular Leukomalacia (n = 1) Traumatic Brain Injury (n = 1) Rhombencephalosynpasis (n = 1) Spina Bifida with Shunting (n = 1) Suspected Neurological condition under investifation. (n = 1)

Clinical Validity

Preliminary clinical validation of the cut-offs presented in table 2.3 was completed by comparing the results of each patient's neuropsychological assessment using the gold standard measures presented in table 2.5. A patient's performance was considered impaired on a gold standard measures if their score fell at or below the 5th percentile (Tatemichi et al., 1994).

Table 2.5
Domain Specific Gold Standard Assessment

CCoSI Domain	Gold Standard Neuropsychological Test
Attention	WISC-IV WMI CPT-2 NEPSY AA
Fluency	NEPSY-II VF
Memory	CMS – dot location/family pictures/word pairs/stories
Language	BPVS TRPG WISC-VCi
Visuospatial	WISC-PRI NEPSY-II Design Copying

If the C-CoSI and Gold standard assessment agreed in identifying a cognitive deficit, a true positive was identified whereas if they agreed in not identifying a cognitive deficit a true negative was identified. False negatives refer to instances the C-COSI incorrectly identify no impairment while false positives rather to instances where the C-COSI incorrectly identify cognitive impairment. As presented in table 2.6, comparison between gold standard assessment and the C-COSI were completed using the cut off scores calculated from the 5th, 10th and 15th percentiles.

Further analysis was completed to determine what threshold would be most suitable for total scores. Total scores were defined as the number of domains a patient passed with maximum being 5 on both forms of the C-COSI. As the 5th and 10th percentile cut-offs were contenders for determining impairment, analysis was completed with these two scores. Table 2.7 presents the sensitivity, specificity, positive predictive value and negative predictive values for defining the total cut offs of the C-COSI using the 5th and 10th percentile scores. Overall, this clinical dataset provided initial evidence that using a domain threshold of the 5th percentile was the best at discriminating between patients with and without cognitive impairment when impairment was compared against gold standard assessment.

Table 2.7
Sensitivity and Specificity analysis for total cut offs at 5th and 10th percentile.

Threshold	Cut-off	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
5 th percentile	≥2	100 (39.8 – 100)	100 (39.8 – 100)	100 (39.8 – 100)	100 (39.8 – 100)
	≥3	50 (6.8-93.2)	100 (39.8 – 100)	100 (15.8 – 100)	66.7 (22.3 – 95.7)
	≥2	100 (39.8 – 100)	25 (0.6 – 80.6)	57.1 (18.4 – 90.1)	100 (2.5 – 100)
10 th percentile	≥3	75.0 (19.4 – 99.4)	75 (19.4 – 99.4)	75 (19.4 – 99.4)	75 (19.4 – 99.4)

Note: PPV = Positive Predictive value. NPV = Negative Predictive Validity

Table 2.6
Error rates for the C-COSI domains at 5th, 10th and 15th percentile

Domain	5 th Percentile					10 th Percentile					15 th Percentile				
	TP	TN	FP	FN	% error	TP	TN	FP	FN	% error	TP	TN	FP	FN	% error
Attention	1	5	2	0	25.0	1	4	3	0	37.5	1	4	3	0	37.5
Fluency	0	6	2	0	25.0	0	5	3	0	37.5	0	4	4	0	50.0
Memory	1	4	1	2	37.5	2	4	1	1	25.0	2	3	2	1	37.5
Language	3	5	0	0	0.0	3	4	1	0	12.5	3	4	1	0	12.5
Visuospatial	1	5	2	0	25.0	1	3	4	0	50.0	1	3	4	0	50.0

Note. % error displays percentage of false classifications. TP = True Positive; TN = True Negative; FP = False Positive; FN = False Negative

Stage 3: Optimising clinical cut-offs

As stage 2 included a very small sample size, Marsh et al. (2026) collected further data from patients from June 2015 – February 2018 at Bristol Royal Hospital for Children with the intention of optimising clinical cut-offs.

Demographic Characteristics

Clinical data was obtained from patient participants who had seen the neuropsychology department at Bristol Royal Hospital for Children. Patients were only included if they had acquired a brain injury or had a suspected/confirmed neurological condition leading to acute admission. Patient, aged 5y0m – 16y11m, were not included if they had progressive neurological condition.

The final sample included 52 patients from 11 age groups: 6 years, 7 years, 8 years, 9 years, 10 years, 11 years, 12 years, 13 years, 14 years, 15 years and 16 years. Data was not collected from 5 years old. Table 2.8 presents the demographic characteristics of this sample.

Table 2.8
Demographic Characteristics of the patient sample while optimising clinical cut offs

Age (years)		Gender (female:male)	Diagnosis
M (SD)	Range		
11.00 (3.46)	6-16	23:31	Epilepsy (N = 12) Cerebrovascular (N = 6) Traumatic Brain Injury (N = 10) Neuro-oncology (N = 8) CNS Infection (N = 3) Other/Multiple Diagnosis (N = 15)

Determining Domain Appropriate Clinical Cut-offs

Domain appropriate clinical cut offs were optimised using an iterative thresholding process based on the 5th percentile cut-offs. This was used to identify the domain score on the C-COSI-Y and C-COSI-A that maximised sensitivity whilst also considering specificity and error rates. Error rates were determined by comparing when the C-COSI identified a deficit with when gold standard assessment identified a deficit. Table 2.9 shows the sensitivity and specificity for the final optimised domain-appropriate clinical cut-off while table 2.10 shows the error rates for each domain-appropriate cut off. As cognitive screeners are designed to quickly identify areas of potential concern (Siddiqui

et al., 2023), the research team placed a higher emphasis on maintaining sensitivity over specificity and error rates during the iterative thresholding process.

Table 2.9
Specificity and sensitivity of the final domain specific cut-offs

Domain	C-COSI-Y				C-COSI-A			
	Cut off	Sensitivity (%)	Specificity (%)	Cut off	Sensitivity (%)	Specificity (%)	Cut off	Specificity (%)
Attention	15	100 (29.24 – 100)	83.33 (51.59 – 97.91)	20	44.44 (13.70 – 78.80)	72.73 (39.03 – 93.98)		
Fluency	7	100 (2.50 – 100)	40 (5.27 – 85.34)	9	100 (2.50 – 100)	66.67 (22.28 – 95.67)		
Memory	18	85.71 (42.13 – 99.64)	81.25 (54.35 – 95.95)	18	85.71 (42.13 – 99.64)	41.18 (18.44 – 67.08)		
Language	30	100 (39.76 – 100)	36.36 (10.93 – 69.21)	33	100 (63.06 – 100)	33.33 (9.92 – 65.11)		
Visuospatial	14	100 (15.81 – 100)	10 (0.25 – 44.50)	14	100 (29.24 – 100)	23.08 (5.04 – 53.81)		

Table 2.10
Error rates of the final domain specific cut-offs

Domain	C-COSI-Y						C-COSI-A					
	Cut-off	TP	TN	FP	FN	Cut-off	TP	TN	FP	FN	Cut-off	TP
Attention	15	3	10	2	0	20	4	8	3	5		
Fluency	7	1	2	3	0	9	1	4	2	0		
Memory	18	4	4	7	0	18	8	4	8	0		
Language	30	6	13	3	1	33	6	7	10	1		
Visuospatial	14	2	1	9	0	14	2	1	9	0		

Note. TP = True Positive; TN = True Negative; FP = False Positive; FN = False Negative

The optimised clinical cut-offs for the C-COSI-Y and C-COSI-A are presented simply in table 2.11. Scores below these cut-offs may indicate difficulties in that specific domain.

Table 2.11
Clinical Cut-offs of the C-COSI-A and C-COSI-Y

	Clinical Cut-offs	
	C-COSI-A	C-COSI-Y
Attention	15	20
Fluency	7	9
Memory	18	18
Language	30	33
Visuospatial	14	14

3

C-COSI: Administration and Scoring

This chapter presents guidance on how to administer and score the C-COSI. It is necessary to follow the administration and scoring procedures outlined in this chapter as deviation from the protocol can invalidate the results obtained.

Overview of C-COSI Administration

The C-COSI consists of two screening questions and 21 subtests that measure five domains of cognition: Attention, Fluency, Language, Memory and visuospatial skills. The C-COSI takes approximately 13 to 16 minutes to administer. Only individuals who have been trained in administering and scoring psychological assessment should administer the C-CoSI.

Age Range and Target Population

The C-CoSI can be administered to ages 5Y0M to 16Y11M. The C-CoSI-Y is designed for ages 5Y0M – 11Y11M while the C-CoSI-A is designed for ages 12Y0M – 16Y11M. It is appropriate for use with typically developing children as well as those with neurological conditions such as acquired brain injury, traumatic brain injury and neurological illness.

C-COSI Materials

It is important that before starting the assessment you have the age-appropriate record form, visual stimulus booklet, jigsaw search response booklet and have a device that can play the auditory attention audio track. You will also need a timer and a pencil. It is important that the assessor is familiar with the test materials before administration.

General Administration

The C-CoSI-Y and C-CoSI-A are easy to learn and administer. However, it is necessary to practice test administration before using. The C-CoSI is a standardised screening test. Normative data was collected following the procedures described in the age-appropriate record forms and manual. To prevent invalidating results, it is important to follow the administration protocol closely. Instructions on the record form should be given verbatim and subtests administered in the order presented on the record forms.

Any modifications to the administration protocol should be noted and interpreted with caution.

During assessment, it is important to build and maintain rapport with the examinee. The examiner should introduce the C-CoSI in a developmentally appropriate way. Feedback

on performance should not be given during the assessment; however, feedback on effort can be provided.

Starting Points, Reversal and Discontinuation Rules

The C-CoSI-Y and C-CoSI-A does not utilise starting points or reversal rules. Additionally, most subtests do not have a discontinuation rule. However, if an examinee of any age fails the screen or an examinee aged 5Y0M – 11Y11M cannot identify whether they are at home or hospital, discontinue the whole test.

Completing the Front Sheet

Before administering the C-CoSI-Y or C-CoSI-A complete the patient information. On the first line record, the child's Name, Gender and Hospital number. On the second line, record the date of testing, followed by the date of birth on line 3 and age at testing on line 4 as shown in figure 3.1. Age should be calculated by subtracting the date of birth from the date of testing, beginning with the day. For this purpose, all months are assumed to have 30 days.

*Figure 3.1
Demonstration of how to complete the front sheet subtracting date of birth from date tested.*

	Year	Month	Day
Date tested	2026	2 3	28 18
Date of birth	2012	1	19
Age	14	1	9

Handedness should be recorded on line 5 and the examiners name on line 6.

Calculating the Index Scores

To calculate the index scores, sum the number of points awarded to each subtest associated with the relevant index. For example, for the visuospatial index, you need to sum the scores from picture copying, jigsaw cancellation, dot counting and silhouettes. Table 3.1 shows which subtests are associated with which index and the total amount of points that can be obtained. To calculate, the total score, sum the number of points awarded to each of the 21 subtest. A total of 104 points can be obtained.

Table 3.1
Maximum scores for each index and the relevant subtests.

Index	Subtest	Maximum score
Attention	Orientation	21
	Registration	
	Sequences	
	Auditory Attention	
Fluency	Phonemic Fluency	14
	Semantic Fluency	
Language	Language	35
	Comprehension	
	Language Production	
	Verbal	
	Comprehension	
	Naming	
	Semantic Knowledge	
Memory	Reading	19
	Delayed Memory	
	Immediate Memory	
	Delayed Memory II	
	Visual Delayed Memory	
Visuospatial	Picture Copying	15
	Jigsaw Cancellation	
	Dot Counting	
	Silhouettes	

Screen

Examinee's answer two questions that help identify whether the patient is disorientated.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M

Item Administration

Say, **I am going to ask you some questions. What is your name?** Correct response [examinee correctly gives name]: Say **How old are you?** Correct response [examinee correctly gives age].

Figure 3.2
Questions on the screen subtest.

<u>SCREEN</u> – (Do not continue with test if patient cannot answer the below questions). 1) <i>What is your name?</i> 2) <i>How old are you?</i>
--

Record responses verbatim.

NOTE: Do NOT continue administration of the C-COSI if examinee provides an incorrect answer on the screen.

Scoring

- Score 1 point if examinee gives the correct answer
- Score 0 points if examinee does not provide correct answer.

3.1 Orientation

This subtest is designed to evaluate if the examinee is orientated to place and time.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M

Item Administration

- Ask each item verbatim and one at a time.
- Do not give prompts.
- Do not give multiple choice options.

Table 3.2
Orientation questions for the C-CoSI-Y (5Y0M – 11Y11M) and C-COSI-A (12Y0M – 16Y11M)

	C-COSI-Y	C-COSI-A
1	Are you at hospital or home?	What is the date today?
2	What is the month?	What is the month?
3	What is the year?	What is the year?
4	What day of the week is it?	Which hospital are we in?
5	What school do we go to?	Which town/city are we in?
6	What country are we in?	What country are we in?

If the C-COSI is being administered outside of a hospital setting, it is acceptable to substitute the building type you are in for a hospital. For example, “**Are you at the health centre or home?**”

Record responses verbatim.

NOTE: Do NOT continue administration of the C-COSI if examinee does not correctly identify whether they are at hospital or at home.

Scoring

- Score 1 point if examinee gives the correct answer
- Score 0 points if examinee does not provide correct answer.
- 6 points can be awarded in total.

3.2 Language Comprehension

Examinees are asked to execute some oral instructions by pointing to the appropriate stimuli.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M **or** Visual stimuli booklet 12Y0M – 16Y11M.

Item Administration

Turn to page 3 in the either visual stimuli booklet. Position the stimulus booklet within view of the examinee.

Say, **Can you place your hands on the table for me?** Correct response [examinee puts hands on table]: **Now, can you point to the black square?** Correct response [examinee correctly points to the black square].

Figure 3.3
Stimuli required for the language comprehension task



If the examinee is unable to correctly place hands on the table and point to the black square, discontinue the subtest and score as 0. If the examinee correctly follows the instructions, proceed with the subtest.

Items 1 – 3

- Read each item verbatim. For each item, speak fluidly and in a normal tone. Do not break up instructions when delivering each item.
- Each item may be repeated *only* once. Say, **Listen carefully** before repeating an item.
- Do not discontinue if the examinee gets an item incorrect.

Scoring

- Score 1 point if examinee gives the correct answer
- Score 0 points if examinee does not provide correct answer.
- Record any repetitions as R.
- 3 points can be awarded in total.

3.3 Registration

Examinees are shown some pictures/words and are required to name or repeat what each they are shown.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M.

Item Administration

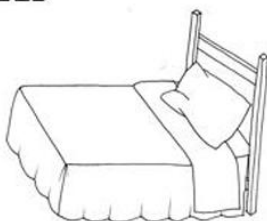
For ages 5Y0M – 11Y11M

Turn to page 5 of the visual stimuli booklet 5Y0M – 11Y11M, and place the booklet within view of the examinee.

Say, **I am going to show you three pictures, and I'd like you to say the names after me** (show three pictures); **Bed, Shoe, Train**. Correct response [examinee repeats each word correctly].

*Figure 3.3
Stimuli required for the registration task*

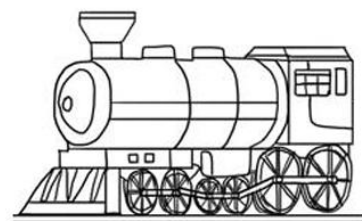
BED



SHOE



TRAIN



Say, **Could you repeat that two more times?**

Once the examinee repeats the three words again twice say, **Try to remember these words, because I am going to ask you about them later.**

For ages 12Y0M – 16Y11M

Say, **I am going to tell you three words, and I'd like you to say them after me** (pause **Bed, Shoe, Train**. Correct response [examinee repeats each word correctly].

Say, **Could you repeat that two more times?**

Once the examinee repeats the three words again twice say, **Try to remember these words, because I am going to ask you about them later.**

Scoring

- Only award points for the immediate repetition of words
 - Score 1 point if examinee gives the correct answer
 - Score 0 points if examinee does not provide correct answer.
- For the two repetition trials, tick when each word is repeated.
- 3 points can be awarded in total.

3.4 Sequences

Examinees are asked to complete a series of sequences such as days of the week or counting.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.

Item Administration

For ages 5Y0M – 6Y11M

Say **Could you count backwards starting from 10? So, like 10, 9, 8, all the way to 0.**

Correct response [examinee says: 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0]

For ages 7Y0M – 11Y11M

Say **Could you count backwards starting from 20? So, like 20, 19, 18, all the way to 0.**

Correct response [examinee says: 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0]

For ages 12Y0M – 16Y11M

Say **Could you say the days of the weeks backwards, starting from Sunday?** Correct response [examinee says: Sunday, Saturday, Friday, Thursday, Wednesday, Tuesday, Monday]

Scoring

- Score 4 points if examinees correctly say the age-appropriate sequence.
- Deduct 1 point for every mistake made.
- If more than 4 errors are made, the examinee scores 0.
- Do NOT stop examinees if a mistake is made. Allow them to proceed and score subsequent answers from the mistake.
- Self-correction is allowed and is not counted as a mistake.
- 4 points can be awarded in total.

3.5 Auditory Attention

Examinees are required to touch a specific shape when they hear the target word.

Materials

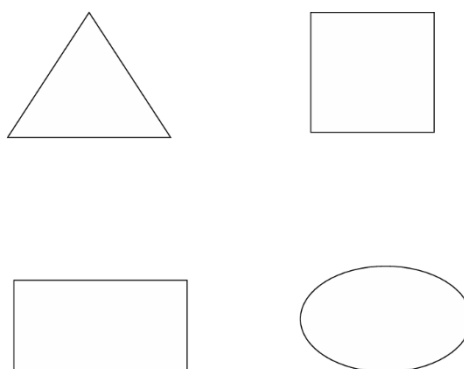
You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M **or** Visual stimuli booklet 12Y0M – 16Y11M.
- Auditory Attention Recording.

Item Administration

For ages 5Y0M to 11Y11M, turn to page 7 of the age-appropriate visual stimuli booklet.
For ages 12Y0M to 16Y11M, turn to page 5 of the age-appropriate visual stimuli booklet.

Figure 3.4
Stimuli required for Auditory Attention



Position the booklet within view of the examinee.

Say **I am going to read you a list of words. Every time I say the word “Triangle” I would like you to touch the picture of the triangle** (point to triangle). **When you hear any other word, don’t do anything. So if I said square, what would you do?** Correct response [examinee indicates nothing].

If the examinee understood the instructions, proceed to the practice. Say **Lets do a practice**. Read the following words at a rate of one word per second. **Round, What, Where, Triangle, Stay, Happy**. Correct response [examinee touches the triangle only when the word triangle is said]. If the practice task is failed, it can be repeated to ensure understanding.

If the examinee demonstrates they understand the task say, **Now I am going to play a recording with a long list of words, are you ready?** If the child indicates they are ready, press play on the recording. Do not provide feedback during test items.

Be sure that the audio can be heard by the child at a comfortable volume.

Recording

Follow along the record form as the audio play. Each time the child touches a shape, record the corresponding letter for that shape (T for triangle, S for square, O for Oval, R for rectangle) next to the word that is being stated as the child touches the circle. Record W for white if the child purposefully touches the white portion of the page.

If the examinee self-corrects, record both the initial and self-correction response on the record form. Apply the scoring rules to both responses. **Is this true?**

Scoring

- Score 1 point if the examinee provides a correct response within the 2 second interval associated with the target word.
- Sum the number of correct responses.

Errors

- **Commission:** Circle “C” if the examinee provides a response that is not within the 2 second interval associated with a target word or provides an incorrect response that is within the 2 second interval associated with a target word.
- **Omission:** Circle “O” if the child does not provide a correct response within the 2 second interval associated with the target word.
- Sum independently the number of commission and omission errors.

Figure 3.5
Example of scoring for Auditory Attention

TRIANGLE		C	
Round T	1	C	O
Time		C	

TRIANGLE		C	
Give	1	C	O
Then T		C	

Overall Score

- Using table 3.3, convert the raw number of correct responses and the raw number of commission errors to the C-CoSI correct and C-CoSI commission.
- Sum the C-COSI correct and C-CoSI commission to get the total score.
- 8 points can be awarded in total.

Table 3.3
Conversion of raw scores

Total Raw correct responses	C-CoSI correct	Total Raw commissions errors	C-CoSI commission
15	4	0	4
13-14	3	1	3
10-12	2	2-4	2
7-10	1	5-7	1
<7	0	>7	0

3.6 Phonemic Fluency

Examinees are required to generate as many words as possible that begin with a specific letter within a set time period.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Timer

Item Administration

Say **I'm going to say a letter, and I'd like you to say as many words as you can, that start with that letter. But I would like you not to say any names or places, so you couldn't say Fred or France, but you could say Fish. Do you understand that?**

(indication examinee understands) **Are you ready? You have 1 minute. The letter I want you to use is S.** Start timer immediately and record answers verbatim on the record sheet.

If an examinee starts to count numbers, the first number is counted but the subsequent numbers are repetitions. Pause the timer, say **Can you give me some different words?** Continue timing.

If an examinee looks like they have stopped or says they can't think of anymore, you can give the following prompt once **Can you think of anymore words beginning with S?**

Do not give warnings of the timings.

After 60 seconds, say **Stop.** Do not count any responses after 60 seconds.

Scoring

- Score 1 point for each unique word starting with the letter S. Verify nonsense words or ambiguous word in a published dictionary such as the Webster's dictionary online.
- If an examinee places an adjective prior to a noun, this should not be counted separately to the noun on its own. For example, big stool will be awarded 1 mark.
- Award 0 points for proper nouns, words that don't begin with S, repetitions or nonsense words.

Repetitions

- If an examinee provides a grammatical variant (e.g. plurals or different tenses) of a word, award only 1 mark for the first word. Subsequent words are scored as 0 and are repetitions. For example, only one mark would be awarded if an

examinee said Snake followed by Snakes. In this cases, snakes would be considered a repetition.

- If an examinee starts counting, award 1 mark for the first number but subsequent numbers are scored as 0 and are repetitions.
- If an examinee uses a word in a diminutive and full form (e.g. Dog, Doggy, Doggo), award 1 mark for the first word and 0 for the subsequent words. These are repetitions.
- If an examinee says the same noun with a different adjective in front, consider only the noun on its own. Either the unique noun or the first adjective + noun combination (depending on which is first) will be awarded the mark and subsequent responses will be considered repetitions and awarded 0. For example, if an examinee said big stool, stool and foot stool only big stool would receive one mark.

Overall Score

- Sum the number of unique correct responses.
- Convert raw scores to Phonemic Fluency scores using table 3.4 and 3.5
- 7 points can be awarded in total.

*Table 3.4
Conversion of raw scores for phonemic fluency for 5Y0M – 11Y11M*

Number of Correct Responses	Phonemic Fluency Score
≥15	7
12 – 14	6
9 – 11	5
7 – 8	4
5 – 6	3
3 – 4	2
1 – 2	1
0	0

*Table 3.5
Conversion of raw scores for phonemic fluency for 12Y0M – 16Y11m*

Number of Correct Responses	Phonemic Fluency Score
≥18	7
12 – 17	6
9 – 11	5
7 – 8	4
5 – 6	3
3 – 4	2
1 – 2	1
9 – 11	0

3.7 Semantic Fluency

Examinees are required to generate as many words as possible that belong to a specific category within a set time period.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Timer

Item Administration

Say **Now I would like you to name as many animals as you can. They can begin with any letter** Start timer immediately and record responses verbatim on the record sheet.

If an examinee looks like they have stopped or says they can't think of anymore, you can give the following prompt once **Can you think of anymore animals?**

Do not give warnings of the timings.

After 60 seconds, say **Stop**. Do not count any responses after 60 seconds.

Scoring

- Score 1 point for each unique word that is an animal. Verify whether nonsense words or ambiguous words are animal using a published dictionary such as the Webster's dictionary online.
- Different species of the same animal are all awarded one mark. For example, Shiatzu, Dog and Border Collie are each awarded one mark.
- If an examinee places an adjective prior to an animal word, this should not be counted separately to the noun on its own. For example, big bear will be awarded 1 mark.
- Award 0 points for proper nouns, words that don't belong to the category, repetitions or nonsense words.

Repetitions

- If an examinee provides a grammatical variant (e.g. plurals) of a word, award only 1 mark for the first word. Subsequent words are scored as 0 and are repetitions. For example, only one mark would be awarded if an examinee said Cat followed by Cats. In this case, Cats would be considered a repetition.
- If an examinee uses a word in a diminutive and full form (e.g. Dog, Doggy, Doggo), award 1 mark for the first word and 0 for the subsequent words. These are repetitions.

- If an examinee says the same animal word with a different adjective in front, consider only the animal word on its own. Either the unique animal word or the first adjective + animal word combination (depending on which is first) will be awarded the mark and subsequent responses will be considered repetitions and awarded 0. For example, if an examinee said big bear, bear and small bear only big bear would receive one mark. The exception is if the adjective differentiates that animal into a different species. For example, brown bear, black bear and polar bear would each uniquely score 1 mark.

Overall Score

- Sum the number of unique correct responses.
- Convert raw scores to semantic fluency scores using table 3.6 and 3.7.
- 7 points can be awarded in total.

*Table 3.6
Conversion of raw scores for semantic fluency for 5Y0M – 11Y11M*

Number of Correct Responses	Semantic Fluency Score
≥18	7
14 – 17	6
11 – 13	5
8 – 10	4
6 – 7	3
4 – 5	2
2 – 3	1
0 – 1	0

*Table 3.7
Conversion of raw scores for semantic fluency for 12Y0M – 16Y11M*

Number of Correct Responses	Semantic Fluency Score
≥20	7
14 – 19	6
11 – 13	5
8 – 10	4
6 – 7	3
4 – 5	2
2 – 3	1
0 – 1	0

3.8 Delayed Memory

Examinees are required to name the three words/pictures that were provided in the registration subtest.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M.

Item Administration

For ages 5Y0M – 11Y11M

Free recall

Say **Do you remember the 3 words I told you towards the start of the tests?** Do not give any prompts. Record verbatim answers.

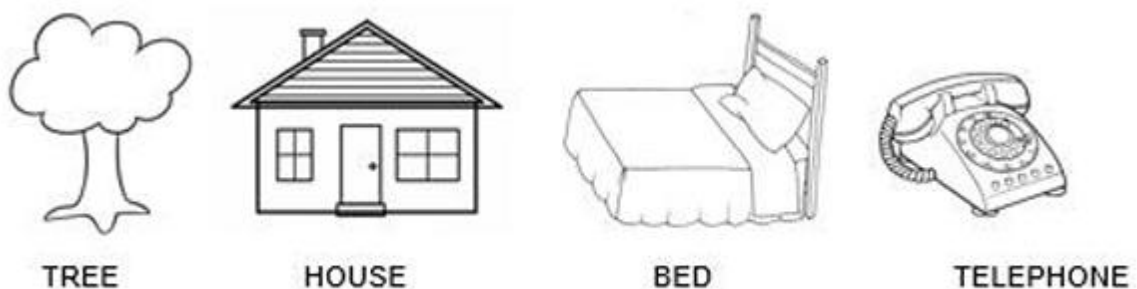
Correct answer [Bed, Shoe, Train].

Recognition

Only administer if one of the items in free recall was recalled incorrectly.

Turn to page 9 and say **can you see any of the pictures that we looked at towards the start?** Record the responses provided by the examinee.

Figure 3.6
Stimuli required for the delayed memory subtest



Correct answer [Bed, Shoe, Train].

For ages 12Y0M – 15Y11M

Say **Do you remember the 3 word I told you towards the start of the test?** Do not give any prompts. Record verbatim answers.

Correct answer [Bed, Shoe, Train].

Scoring

For ages 5Y0M – 11Y11M

- Score 2 points for each freely recalled item.
- Score 1 point for each item correctly recognised when the pictures are shown.
- Score 0 points for anything else.
- Children can score either 0, 1 or 2 points for each item.
- 6 points can be awarded in total.

For ages 12Y0M – 15Y11M

- Score 2 points for each freely recalled item.
- Score 0 points for anything else.
- Children can score either 0 or 2 points for each item.
- 6 points can be awarded in total.

3.9 Immediate Memory

Examinees are shown some pictures or hear some words and are asked to immediately recall what was provided.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M.

Item Administration

For ages 5Y0M – 11Y11M

Turn to page 11 of the visual stimuli booklet 5Y0M – 11Y11M and position in front of the view of the examinee.

Say, **This is Michael look at him closely as I am going to ask you some questions?** (pause). **Can you tell me one thing Michael was wearing?** Circle the response the examinee gives [possible answers: Shorts, Jumper, Shoes/Trainers, socks]. **Can you tell me the colour of something else he was wearing?** Circle the response the examinee gives [possible answers: blue, white]. **Can you tell me what sport he was playing?** Circle the response the examinee gives [possible answers: football].

*Figure 3.7
Stimuli required for the immediate memory task*



Remove visual stimuli book and say **Can you repeat those three things 3 times for me? Try and remember them for later.**

Record examinees response.

For ages 12Y0M – 16Y11M

Say I'm going to tell you some things about a man and I'd like you to repeat his name, favourite food and favourite sport after me 3 times, and remember them.

Say the following three words with a 1-second interval between each word **Michael Rogers, Pizza, Football.**

Record examinees response.

Scoring

- Score 1 point for each correct word in each category for the **1st repetition only.** Do not award points for subsequent repetitions.
- Score 0 points for any incorrect word said.
- 3 points can be scored in total.

3.10 Visual Memory

Examinees are shown four pictures and asked to try to remember these.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M **or** Visual stimuli booklet 12Y0M – 16Y11M.

Item administration

Say I'm going to show you four pictures. Later I am then going to mix them up, and I'd like you to pick them out of a bigger group of pictures, so look at them carefully.

Turn to page 13 in visual stimuli booklet 5Y0M – 11Y11M or page 7 in visual stimuli booklet 12Y0M – 16Y11M. Show each item for five seconds before turning the page.

*Figure 3.8
Example item on the visual memory task*



Note: This subtest does not have any scoring so proceed to next subtest.

3.11 Language Production

Examinees are shown some pictures and are asked to create a short verbal story regarding them.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M **or** Visual stimuli booklet 12Y0M – 16Y11M.

Item Administration

For ages 5Y0M – 11Y11M

Turn to page 20 in the age-appropriate visual stimulus booklet and say **These pictures tell a story. Could you tell me what they are doing or what the story is?** Record verbatim responses.

*Figure 3.9
Example item on the language production task*



If a child appears stuck on how to respond include extra prompts like **where are they?** Record when these prompts are used.

There is no time limit for this task.

For ages 12Y0M – 16Y11M

Turn to page 15 in the age-appropriate visual stimulus booklet and say **These pictures tell a story. Could you tell me what they are showing or what the story is?** Record verbatim responses.

If a child appears stuck on how to respond include extra prompts like **where are they?** Record when these prompts are used.

There is no time limit for this task.

Scoring

- 1 point is awarded for good detail (goes beyond basic description and includes abstract details – i.e. 0 points for the girl is there and there are penguins. 1 point for the girl is at the zoo where there are parents).
- 1 point is awarded for good structure. (no grammatical errors, sentence structure is logical and follows typical rules).
- 1 point is awarded for full sentences.
- 3 points can be awarded in total.

3.12 Verbal Comprehension

Examinees are told a series of short sentences and asked to repeat them verbatim.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.

Item Administration

Say **Can you repeat the following sentences exactly how I say them.**

Administer each item in a normal reading voice and allow the examinee to respond before continuing to the next item.

Scoring

- Award one point for any response that contains an underlined word.
- Award one point for any response that repeats the sentence verbatim.
- 12 points can be awarded in total.

Table 3.8
Scoring guidance for the verbal comprehension

-
1. **Sleep** well
 2. The dogs **run** home
 3. The cat saw the **buttercup**
 4. Bob drove the **tractor** home
 5. The **caterpillar** ate the leaf for lunch
 6. Lucy used the **computer** for her homework
-

3.13 Naming

Examinees are asked to name some pictures.

Materials

You will need:

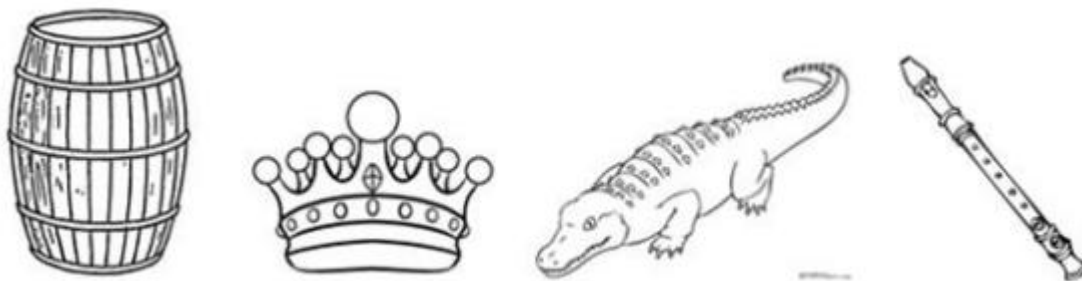
- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M **or** Visual stimuli booklet 12Y0M – 16Y11M.
- Timer

Item Administration

Turn to page 22 in visual stimuli booklet 5Y0M – 11Y11M or page 17 in visual stimuli booklet 12Y0M – 16Y11M.

Say **Can you name these items?** Begin timing. Point to each item starting with the top left, moving across rows from left to right, top to bottom. Record whether the child correctly names the item.

*Figure 3.10
Example items in the naming subtest*



No prompts or cue are permitted.

Record the time taken to complete naming.

Scoring

- Score 1 point for each correctly named item.
- Score 0 points for items named incorrectly.
- 12 points can be awarded in total.

3.14 Semantic Knowledge

Examinees are asked to identify which picture belongs to a specific category.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M **or** Visual stimuli booklet 12Y0M – 16Y11M.

Item administration

Turn to page 22 in visual stimuli booklet 5Y0M – 11Y11M or page 17 in visual stimuli booklet 12Y0M – 16Y11M.

Say **Can you** (read item verbatim). Read at a normal reading pace.

Scoring

- Score 1 point for each correctly identified item
- Score 0 points for anything else.
- 4 points can be awarded in total.

Table 3.9
Scoring guidelines for the semantic knowledge subtest

Question	1 point answer
Point to the one to do with royalty	Crown
Point to the one which is a reptile	Crocodile
Point to the one which is found in Australia	Kangaroo*
Point to the one which is to do with literacy	Book

*If a child says Crocodile or penguin, prompt with **Any other animals that live in Australia**

3.15 Reading

Examinees are required to read some words or letters.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M **or** Visual stimuli booklet 12Y0M – 16Y11M.

Item administration

For ages 5Y0M – 11Y11M

Turn to page 24 in visual stimuli booklet 5Y0M – 11Y11M and say, **Can you read the following letters out loud?** Point to each word and record whether the examinee says the letters correctly.

For ages 12Y0M – 16Y11M

Turn to page 19 in visual stimuli booklet 12Y0M – 16Y11M and say, **Can you read the following words out loud?** Point to each word and record whether the examinee says the word correctly.

Scoring

- Score 1 point if all four letters/words are pronounced correctly.
- Score 0 points if even one letter/word is not pronounced correctly.
- 1 point can be awarded in total.

3.16 Picture Copying

Examinees must copy a series of images as accurately as they possibly can.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Pencil

Item Administration

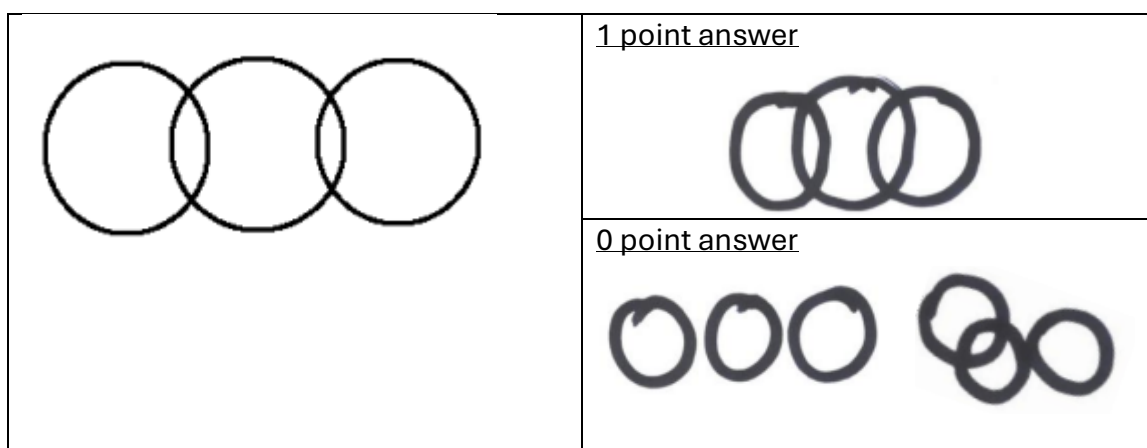
Turn to page 7 of the age-appropriate record form. The examinee should not be able to see any of their previous marks. Say, **Can you copy the following image?** Hand the examinee the pencil and point to the blank space beside the images.

If the child appears to rush say, **there is no time limit so you can take your time to get the picture right.**

Scoring

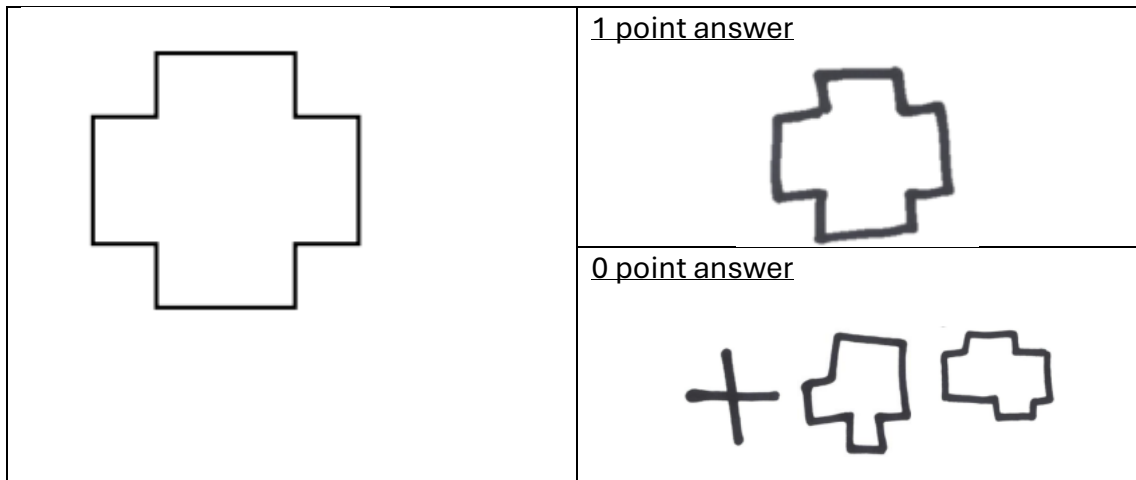
- Score 1 point for shape 1 if exactly 3 circular figures on a horizontal axis are present with no major distortions. The left and right cannot touch but must overlap with the central circle.
- Score 0 for shape 1 for anything else

Figure 3.11
Scoring guidance for item 1 on the picture copying subtest



- Score 1 point for shape 2 if a 2-dimensional cross figure is present. No major distortions are allowed and the horizontal and vertical areas of the cross must be roughly parallel to the opposite and horizontal vertices arms.
- Score 0 points for shape 2 if anything else.

Figure 3.12
Scoring guidance for item 2 on the picture copying subtest



- 2 points can be awarded in total.

3.17 Jigsaw Cancellation

Examinees must identify as many of the target shape that is hidden amongst different and rotated shapes.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M **or** Visual stimuli booklet 12Y0M – 16Y11M.
- Jigsaw search booklet 5Y0M – 11Y11M **or** Jigsaw Search booklet 12Y0M – 16Y11M.
- Timer
- Pencil

Item Administration

Turn to page 7 of the age appropriate record form. Turn to page 26 in visual stimuli booklet 5Y0M – 11Y11M or page 21 in visual stimuli booklet 12Y0M – 16Y11M.

*Figure 3.13
Target item in Jigsaw Cancellation*

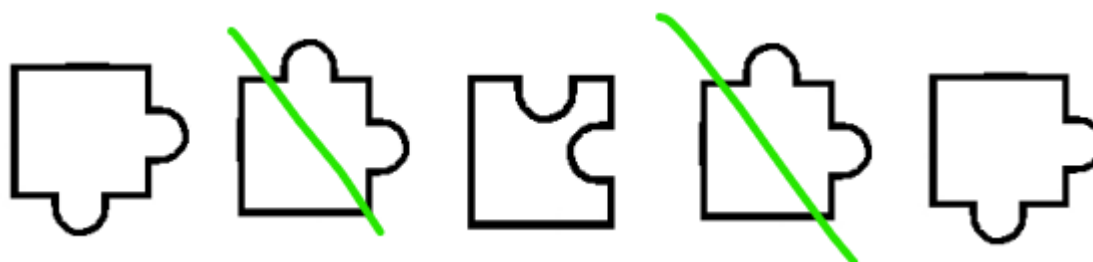


Say **I am going to show you a number of jigsaw pieces, and I would like you to put a mark on any of the pieces that look like this piece** (point to target shown in age-appropriate visual stimuli book). **Lets have a practice.**

Provide the examinee a pencil and let them practice on the sample items. It is permitted to give the prompt **Only mark the shapes that are turned the same way as the this piece** (point to target shown in age-appropriate stimuli book)

The correct answer is the 2nd and 4th shape.

Figure 3.14
Example of correctly performed practice trial in jigsaw cancellation



After the practice, give the child the age-appropriate jigsaw search

Remove the record form and provide the child with the age-appropriate jigsaw search booklet. Keep the visual stimuli book open on the correct page. Say **you will have 30 seconds to do this, so I would like you to try and do this as quickly as you can without making mistakes.** Start timing.

After 30seconds has passed say **Stop!**

Scoring

- Total up the number of correct responses. These are shapes that match the target.
- Total up the number of incorrect responses including target shapes that orientated incorrectly.
- Convert raw scores into C-COSI variants.

Table 3.10
Scoring conversion for the C-COSI-A and C-COSI-Y jigsaw cancellation

C-COSI-Y				C-COSI-A			
Correct Raw	Correct CCOSI	Incorrect Raw	Incorrect C-COSI	Correct Raw	Correct CCOSI	Incorrect Raw	Incorrect C-COSI
19 – 20	4	0	2	23 – 24	4	0	2
15 – 18	3	1 – 3	1	19 – 22	3	1 – 3	1
11 – 14	2	>3	0	16 – 18	2	>3	0
8 – 10	1			13 – 15	1		
<8	0			<13	0		

- Sum the C-COSI correct score and C-COSI incorrect score.
- 6 points can be awarded in total.

3.18 Dot Counting

Examinees are required to identify how many targets shapes are present without pointing.

Materials

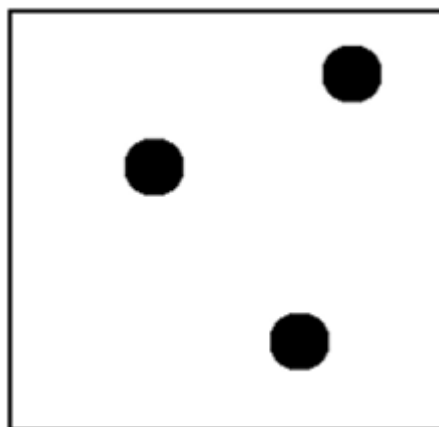
You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M **or** Visual stimuli booklet 12Y0M – 16Y11M.

Item Administration

Turn to page 28 in visual stimuli booklet 5Y0M – 11Y11M or page 23 in visual stimuli booklet 12Y0M – 16Y11M. Say, **I am going to show you some dice. Can you count the dots without point?** Record the response.

Figure 3.15
Sample Item on dot counting



Repeat for items 2 and 3, eliminating the instructions if the child understands.

Scoring

- Score 1 point for the correct response.
- Score 0 points for any other response.
- 3 points can be awarded in total.

Table 3.11
Scoring conversation for C-COSI-Y and C-COSI-A dot counting

Item	Correct answer - C-COSI Y	Correct answer - C-COSI A
1	3	5
2	5	7
3	4	6

3.19 Silhouettes

Examinees are asked to identify what the blacked-out objects shown are.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M **or** Visual stimuli booklet 12Y0M – 16Y11M.

Item Administration

Turn to page 34 in visual stimuli booklet 5Y0M – 11Y11M or page 29 in visual stimuli booklet 12Y0M – 16Y11M. Say, **Can you tell me what these objects are?** Record the responses on the record form.

*Figure 3.16
Sample items on silhouettes*



Scoring

- Score 1 point for the correct response.
- Score 0 points for any other response.
- 4 points can be awarded in total.

3.20 Delayed Memory II

Examinees are required to recall what they can about what they heard/saw in the immediate memory subtest.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M **or** Visual stimuli booklet 12Y0M – 16Y11M.

Item Administration

For ages 5Y0M – 11Y11M:

Free Recall

Say **Can you remember the boy I told you about earlier? Can you tell me everything you remember about him?**

Record verbatim responses

Cued recall

Only administer cued recall if 1 or more of the free recall answers are incorrect.

Say **What was he wearing?** Record response. **What was the colour?** Record response **What was the sport?** Record response.

If there are any omission or errors using these prompts, provide all choices for the category.

Say **Was he wearing a – Wolly Hat, - Short/Jumpers/Shoes** (pick the option the examinee used in the immediate recall subtest), **or - Trousers** correct answer: [short/Jumpers/Shoes].

Say **Was the colour a – Blue/White** (pick the option the examinee used in the immediate recall subtest) – **Red, or - Green** correct answer: [Blue/White].

Say **Was he playing a – Golf, - Rounders, or -Football** correct answer: [football].

Records responses.

For ages 12Y0M – 16Y11M:

Free Recall

Say **Can you remember the man I told you about earlier? Can you tell me everything you remember about him?**

Record verbatim responses

Cued recall

Only administer cued recall if 1 or more of the free recall answers are incorrect.

Say **What was his name** Record response. **What was the food?** Record response
What was the sport? Record response.

If there are any omission or errors using these prompts, provide all choices for the category.

Say **Was he named – Michael Rodgers, - Ian Willow or - Harry Lane.** correct answer: [Michael Rodgers].

Say **Was the food – Ice-cream, - Pizza or - Sandwiches.** correct answer: [Pizza].

Say **Was he playing a – Golf, - Rounders, or -Football** correct answer: [football].

Records responses.

Scoring

- Score 2 points for each correct free recall response.
- Score 1 point for each total cued response, if administered.
- Score 0 points for incorrect responses.
- Sum the number of free recall and cued recall responses.
- 6 points can be awarded in total.

3.21 Visual delayed Memory

Examinees are required to recall what they were shown in the visual memory subtest.

Materials

You will need:

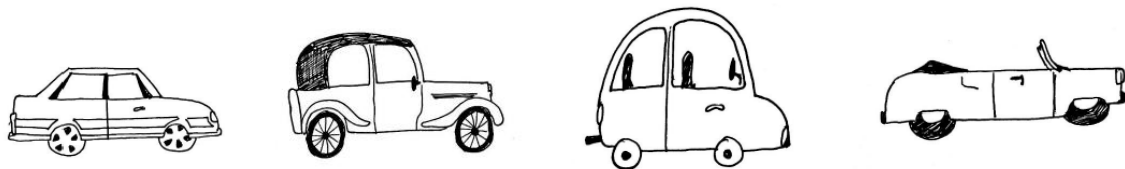
- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Visual stimuli booklet 5Y0M – 11Y11M **or** Visual stimuli booklet 12Y0M – 16Y11M.

Item Administration

Turn to page 36 in visual stimuli booklet 5Y0M – 11Y11M or page 31 in visual stimuli booklet 12Y0M – 16Y11M.

Say **I showed you four pictures earlier. Can you pick them out of all these pictures? Which car did I show you?** Record response.

Figure 3.17
Sample targets on visual delayed memory



Turn the page and say **which table did I show you?** Record response.

Turn the page and say **which house did I show you?** Record response.~

Turn the page and say **which teapot did I show you?** Record response.

Scoring

- Score 1 point for each object identified correctly. Correct answers are in bold.
- Score 0 points for any other answer.
- 4 points can be awarded in total.

Table 3.12
Scoring matrix for visual delayed memory

Which car?	1	2	3	4	5
Which table?	1	2	3	4	5
Which house?	1	2	3	4	5
Which teapot?	1	2	3	4	5

4

eC-COSI: Administration and Scoring

This chapter presents development, administration and scoring of the eC-COSI. As the eC-COSI is structurally similar to the C-COSI much of this chapter may feel repetitive; however, there are differences between the administration of the eC-COSI and C-COSI.

Development of the eC-COSI

The electronic version of the C-COSI (eC-COSI) was developed in 2019 as a response to the rise in teleneuropsychology practice which enables assessment and consultation of patients virtually through video teleconferencing platforms.

The structure of the eC-COSI is alike to that of the C-COSI; however, minor adjustments to the stimuli were made to facilitate virtual stimuli. These included digitalising the physical visual stimuli booklets, asking participants to point to the corner of the screen their target response answer would be, and sending participants physical copies of the picture copying task and jigsaw cancellation.

Like the C-COSI, the eC-COSI was divided into two age-appropriate forms: the eC-COSI-Y and eC-COSI-A.

Demographic Characteristics

During the COVID-19 pandemic, Amawi et al. (2023) collected to validate the eC-COSI against the normative data of the C-COSI. Data for the eC-COSI was obtained from a sample of healthy participants between aged 5Y0M – 16Y11M. To be eligible for the study, participants had to be fluent in English, have access to a personal computer with a webcam and have no history of neurological damage, mental illness, special educational needs and/or developmental disorders.

The final sample, demonstrated in table 4.1 included 44 patients from 12 age groups: 5 years, 6 years, 7 years, 8 years, 9 years, 10 years, 11 years, 12 years, 13 years, 14 years, 15 years and 16 years.

Table 4.1
Demographics Characteristics for the healthy sample used for eC-COSI validation

Location	Age (years)		Handedness (right:left)	Gender (female:male)
	M (SD)	Range		
Virtual (N = 44)	11.79 (3.03)	5.25 – 16.92	38:6	25:19

Comparison to the C-COSI

Initial analysis identified that results from the eC-COSI produced slightly higher mean total scores than the C-COSI as shown in table 4.2. However, there was no evidence that eC-COSI produced significantly higher scores than the C-COSI.

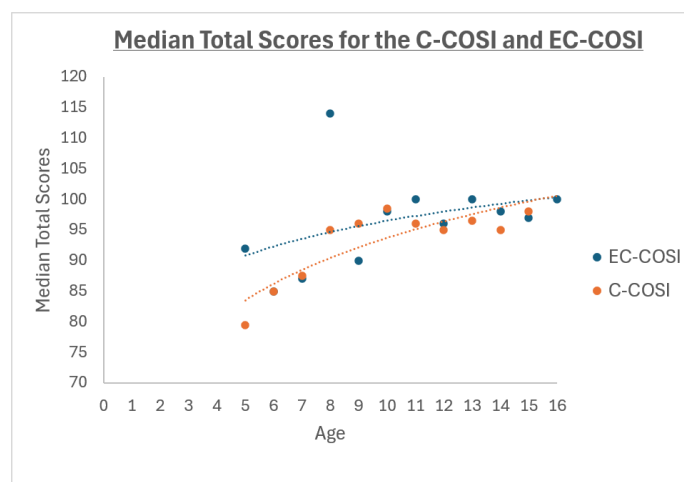
As show in figure 4.1 a significant positive correlation was observed between age and total scores on the eC-COSI, with older children scoring higher scores. Like the C-COSI, this appeared to be steepest between ages 5 and 12 before plateauing.

While further research is needed to develop specific normative data for the eC-COSI, it is valid to use the C-COSI cut-offs.

Table 4.2
Demographics Characteristics for the healthy sample used for eC-COSI validation

Age Group	Modality	Mean Total Score	Standard deviation	N
5Y0M – 11Y11M	Face to face	90.92	8.21	142
	Video teleconferencing	93.30	6.66	22
	Total	91.24	8.04	164
12Y0M – 16Y11M	Face to face	96.04	3.61	98
	Video teleconferencing	97.45	3.97	22
	Total	96.30	3.70	120
Total	Face to face	93.01	7.17	240
	Video teleconferencing	95.39	5.81	44
	Total	93.38	7.02	284

Figure 4.1
Scatterplot showing median total scores on the C-COSI and eC-COSI by age.



Age Range and Target Population

The eC-COSI can be administered to ages 5Y0M to 16Y11M. The eC-COSI-Y is designed for ages 5Y0M – 11Y11M while the eC-COSI-A is designed for ages 12Y0M – 16Y11M. It is appropriate for use with typically developing children as well as those with neurological conditions such as acquired brain injury, traumatic brain injury and neurological illness. The eC-COSI is designed for use in virtual assessments.

eC-COSI Materials

It is important that before starting the assessment the examiner has the age-appropriate record form, digital visual stimulus booklet, computer that can share audio and screen, a timer and a pencil. The examinee will need to have a pencil and paper prior to administration of the eC-COSI as well as having access to a pencil and computer with a webcam.

It is important that the assessor is familiar with the test materials before administration.

General Administration

As the eC-COSI and C-COSI are structurally similar, it will not be useful in this section to repeat the guidance on general administration; starting points, reversal rules and discontinuation rules; completing the front sheet; or calculating index scores. This information is identical to the C-COSI and can be found in chapter 3.

Tele-assessment Guidance

When administering the eC-COSI, it is important to ensure that both the assessor and examinee have a strong enough broadband to administer the assessment as well as a computer that can play audio, share a screen and has a web camera. The examinee should be sat in a well-lit room without distractions. If possible, it is useful to not have other individuals in the room, including parents. If another person is present, you must remind this individual that they are not allowed to answer or help the examinee as this could invalidate the results of the assessment.

Screen

Examinee's answer two questions that help identify whether the patient is disorientated.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M

Item Administration

Say, **I am going to ask you some questions. What is your name?** Correct response [examinee correctly gives name]: Say **How old are you?** Correct response [examinee correctly gives age].

Figure 4.2
Questions on the screen subtest.

<u>SCREEN</u> – (Do not continue with test if patient cannot answer the below questions). 1) <i>What is your name?</i> 2) <i>How old are you?</i>
--

Record responses verbatim.

NOTE: Do NOT continue administration of the eC-COSI if examinee provides an incorrect answer on the screen.

Scoring

- Score 1 point if examinee gives the correct answer
- Score 0 points if examinee does not provide correct answer.

4.1 Orientation

This subtest is designed to evaluate if the examinee is orientated to place and time.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M

Item Administration

- Ask each item verbatim and one at a time.
- Do not give prompts.
- Do not give multiple choice options.

Table 4.3
Orientation questions for the eC-CoSI-Y (5Y0M – 11Y11M) and eC-COSI-A (12Y0M – 16Y11M)

	eC-COSI-Y	eC-COSI-A
1	Are you at hospital or home?	What is the date today?
2	What is the month?	What is the month?
3	What is the year?	What is the year?
4	What day of the week is it?	Which hospital are we in?
5	What school do we go to?	Which town/city are we in?
6	What country are we in?	What country are we in?

If the eC-COSI is being administered outside of a hospital setting, it is acceptable to substitute the building type you are in for a hospital. For example, “**Are you at the health centre or home?**”

Record responses verbatim.

NOTE: Do NOT continue administration of the eC-COSI if examinee does not correctly identify whether they are at hospital or at home.

Scoring

- Score 1 point if examinee gives the correct answer
- Score 0 points if examinee does not provide correct answer.
- 6 points can be awarded in total.

4.2 Language Comprehension

Examinees are asked to execute some oral instructions by pointing to the appropriate stimuli.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital Visual stimuli booklet 5Y0M – 11Y11M **or** Digital Visual stimuli booklet 12Y0M – 16Y11M.

Item Administration

Turn to page 2 in the either visual stimuli booklet. Position the stimulus booklet within view of the examinee.

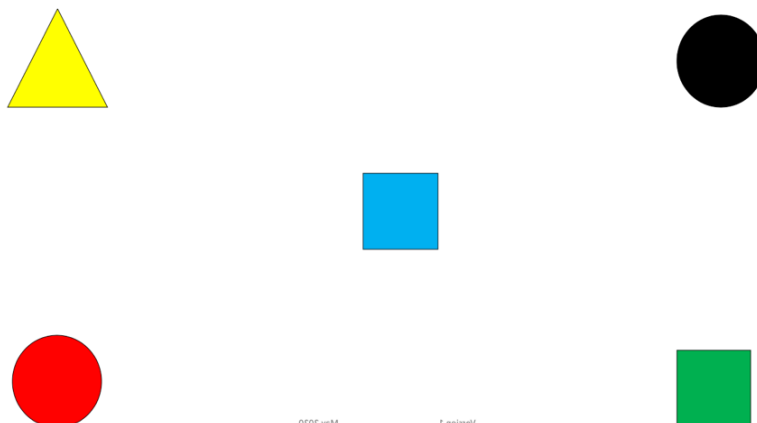
Say, **Here are 5 shapes. I'm going to ask you to point to some of these shapes. To point a shape, you point to a corner or to the middle, wherever the shape is** [point to a corner as an example] **Lets have a practice. Point to the black circle. Point to the yellow triangle. Point to the green square. Point to the red circle. Point to the blue square.**

If the patients makes a mistake you can correct them to ensure they understand the instructions.

Say, **Now lets do some more. Point to the black circle.**

If the examinee is unable to point to the black square, discontinue the subtest and score as 0. If the examinee correctly follows the instructions, proceed with the subtest.

Figure 4.3
Stimuli required for the language comprehension task



Items 1 – 3

- Read each item verbatim. For each item, speak fluidly and in a normal tone. Do not break up instructions when delivering each item.
- Each item may be repeated *only* once. Say, **Listen carefully** before repeating an item.
- Do not discontinue if the examinee gets an item incorrect.

Scoring

- Score 1 point if examinee gives the correct answer
- Score 0 points if examinee does not provide correct answer.
- Record any repetitions as R.
- 3 points can be awarded in total.

4.3 Registration

Examinees are shown some pictures/words and are required to name or repeat what each they are shown.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital visual stimuli booklet 5Y0M – 11Y11M.

Item Administration

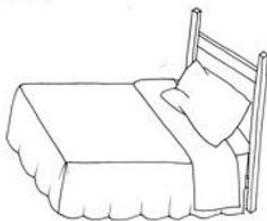
For ages 5Y0M – 11Y11M

Turn to page 4 of the digital visual stimuli booklet 5Y0M – 11Y11M, and place the booklet within view of the examinee.

Say, **I am going to show you three pictures, and I'd like you to say the names after me** (show three pictures); **Bed, Shoe, Train**. Correct response [examinee repeats each word correctly].

*Figure 4.4
Stimuli required for the registration task*

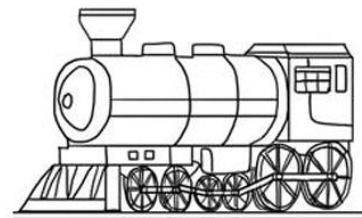
BED



SHOE



TRAIN



Say, **Could you repeat that two more times?**

Once the examinee repeats the three words again twice say, **Try to remember these words, because I am going to ask you about them later.**

For ages 12Y0M – 16Y11M

Say, **I am going to tell you three words, and I'd like you to say them after me** (pause **Bed, Shoe, Train**. Correct response [examinee repeats each word correctly].

Say, **Could you repeat that two more times?**

Once the examinee repeats the three words again twice say, **Try to remember these words, because I am going to ask you about them later.**

Scoring

- Only award points for the immediate repetition of words
 - Score 1 point if examinee gives the correct answer
 - Score 0 points if examinee does not provide correct answer.
- For the two repetition trials, tick when each word is repeated.
- 3 points can be awarded in total.

4.4 Sequences

Examinees are asked to complete a series of sequences such as days of the week or counting.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.

Item Administration

For ages 5Y0M – 6Y11M

Say **Could you count backwards starting from 10? So, like 10, 9, 8, all the way to 0.**

Correct response [examinee says: 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0]

For ages 7Y0M – 11Y11M

Say **Could you count backwards starting from 20? So, like 20, 19, 18, all the way to 0.**

Correct response [examinee says: 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0]

For ages 12Y0M – 16Y11M

Say **Could you say the days of the weeks backwards, starting from Sunday?** Correct response [examinee says: Sunday, Saturday, Friday, Thursday, Wednesday, Tuesday, Monday]

Scoring

- Score 4 points if examinees correctly say the age-appropriate sequence.
- Deduct 1 point for every mistake made.
- If more than 4 errors are made, the examinee scores 0.
- Do NOT stop examinees if a mistake is made. Allow them to proceed and score subsequent answers from the mistake.
- Self-correction is allowed and is not counted as a mistake.
- 4 points can be awarded in total.

4.5 Auditory Attention

Examinees are required to touch a specific shape when they hear the target word.

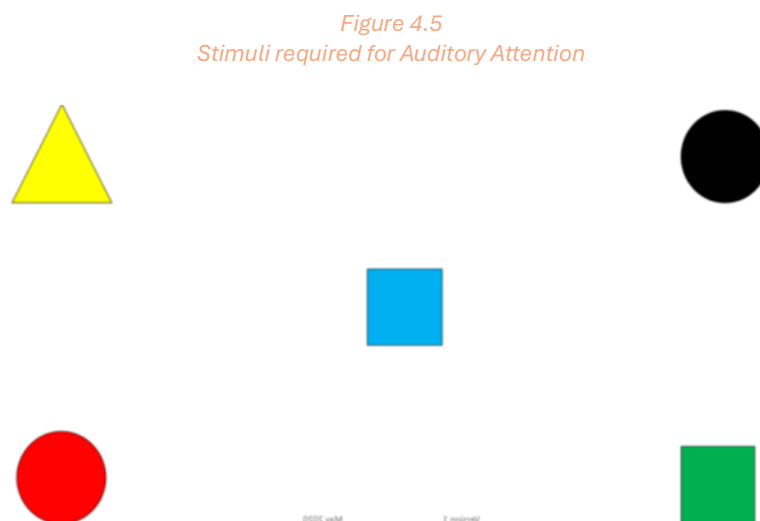
Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital visual stimuli booklet 5Y0M – 11Y11M **or** Digital visual stimuli booklet 12Y0M – 16Y11M.
- Auditory Attention Recording.

Item Administration

For ages 5Y0M to 11Y11M, turn to page 6 of the age-appropriate visual stimuli booklet. For ages 12Y0M to 16Y11M, turn to page 4 of the age-appropriate visual stimuli booklet.



Position the booklet within view of the examinee.

Say **We are going to point to some shapes again, in the same way as before** [Have the patient practice pointing to each shape]. **Now I am going to read you a list of words. Each time I say the word ‘triangle’ I would like you to point to the triangle. When you any other word, don’t do anything. So, if I said square what would you do?** Correct response [examinee indicates nothing].

If the examinee understood the instructions, proceed to the practice. Say **Lets do a practice**. Read the following words at a rate of one word per second. **Round, What, Where, Triangle, Stay, Happy**. Correct response [examinee touches the triangle only when the word triangle is said]. If the practice task is failed, it can be repeated to ensure understanding. Remember that the patient’s video is flipped.

If the examinee demonstrates they understand the task say, **Now I am going to play a recording with a long list of words, are you ready?** If the child indicates they are ready, press play on the recording. Do not provide feedback during test items.

Be sure that the audio can be heard by the child at a comfortable volume.

Recording

Follow along the record form as the audio play. Each time the child touches a shape, record the corresponding letter for that shape (T for triangle, S for square, O for Oval, R for rectangle) next to the word that is being stated as the child touches the circle. Record W for white if the child purposefully touches the white portion of the page.

If the examinee self-corrects, record both the initial and self-correction response on the record form. Apply the scoring rules to both responses. **Is this true?**

Scoring

- Score 1 point if the examinee provides a correct response within the 2 second interval associated with the target word.
- Sum the number of correct responses.

Errors

- **Commission:** Circle “C” if the examinee provides a response that is not within the 2 second interval associated with a target word or provides an incorrect response that is within the 2 second interval associated with a target word.
- **Omission:** Circle “O” if the child does not provide a correct response within the 2 second interval associated with the target word.
- Sum independently the number of commission and omission errors.

Figure 4.6
Example of scoring for Auditory Attention

TRIANGLE			
Round T	1	C	O
Time		C	

TRIANGLE			
Give	1	C	O
Then T		C	

Overall Score

- Using table 4.4, convert the raw number of correct responses and the raw number of commission errors to the eC-CoSI correct and eC-CoSI commission.
- Sum the eC-COSI correct and eC-CoSI commission to get the total score.
- 8 points can be awarded in total.

Table 4.4
Conversion of raw scores

Total Raw correct responses	eC-CoSI correct	Total Raw commissions errors	eC-CoSI commission
15	4	0	4
13-14	3	1	3
10-12	2	2-4	2
7-10	1	5-7	1
<7	0	>7	0

4.6 Phonemic Fluency

Examinees are required to generate as many words as possible that begin with a specific letter within a set time period.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Timer

Item Administration

Say **I'm going to say a letter, and I'd like you to say as many words as you can, that start with that letter. But I would like you not to say any names or places, so you couldn't say Fred or France, but you could say Fish. Do you understand that?**

(indication examinee understands) **Are you ready? You have 1 minute. The letter I want you to use is S.** Start timer immediately and record answers verbatim on the record sheet.

If an examinee starts to count numbers, the first number is counted but the subsequent numbers are repetitions. Pause the timer, say **Can you give me some different words?** Continue timing.

If an examinee looks like they have stopped or says they can't think of anymore, you can give the following prompt once **Can you think of anymore words beginning with S?**

Do not give warnings of the timings.

After 60 seconds, say **Stop.** Do not count any responses after 60 seconds.

Scoring

- Score 1 point for each unique word starting with the letter S. Verify nonsense words or ambiguous word in a published dictionary such as the Webster's dictionary online.
- If an examinee places an adjective prior to a noun, this should not be counted separately to the noun on its own. For example, big stool will be awarded 1 mark.
- Award 0 points for proper nouns, words that don't begin with S, repetitions or nonsense words.

Repetitions

- If an examinee provides a grammatical variant (e.g. plurals or different tenses) of a word, award only 1 mark for the first word. Subsequent words are scored as 0 and are repetitions. For example, only one mark would be awarded if an

examinee said Snake followed by Snakes. In this cases, snakes would be considered a repetition.

- If an examinee starts counting, award 1 mark for the first number but subsequent numbers are scored as 0 and are repetitions.
- If an examinee uses a word in a diminutive and full form (e.g. Dog, Doggy, Doggo), award 1 mark for the first word and 0 for the subsequent words. These are repetitions.
- If an examinee says the same noun with a different adjective in front, consider only the noun on its own. Either the unique noun or the first adjective + noun combination (depending on which is first) will be awarded the mark and subsequent responses will be considered repetitions and awarded 0. For example, if an examinee said big stool, stool and foot stool only big stool would receive one mark.

Overall Score

- Sum the number of unique correct responses.
- Convert raw scores to Phonemic Fluency scores using table 4.5 and 4.6
- 7 points can be awarded in total.

*Table 4.5
Conversion of raw scores for phonemic fluency for 5Y0M – 11Y11M*

Number of Correct Responses	Phonemic Fluency Score
≥15	7
12 – 14	6
9 – 11	5
7 – 8	4
5 – 6	3
3 – 4	2
1 – 2	1
0	0

*Table 4.6
Conversion of raw scores for phonemic fluency for 12Y0M – 16Y11m*

Number of Correct Responses	Phonemic Fluency Score
≥18	7
12 – 17	6
9 – 11	5
7 – 8	4
5 – 6	3
3 – 4	2
1 – 2	1
9 – 11	0

4.7 Semantic Fluency

Examinees are required to generate as many words as possible that belong to a specific category within a set time period.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Timer

Item Administration

Say **Now I would like you to name as many animals as you can. They can begin with any letter** Start timer immediately and record responses verbatim on the record sheet.

If an examinee looks like they have stopped or says they can't think of anymore, you can give the following prompt once **Can you think of anymore animals?**

Do not give warnings of the timings.

After 60 seconds, say **Stop**. Do not count any responses after 60 seconds.

Scoring

- Score 1 point for each unique word that is an animal. Verify whether nonsense words or ambiguous words are animal using a published dictionary such as the Webster's dictionary online.
- Different species of the same animal are all awarded one mark. For example, Shiatzu, Dog and Border Collie are each awarded one mark.
- If an examinee places an adjective prior to an animal word, this should not be counted separately to the noun on its own. For example, big bear will be awarded 1 mark.
- Award 0 points for proper nouns, words that don't belong to the category, repetitions or nonsense words.

Repetitions

- If an examinee provides a grammatical variant (e.g. plurals) of a word, award only 1 mark for the first word. Subsequent words are scored as 0 and are repetitions. For example, only one mark would be awarded if an examinee said Cat followed by Cats. In this case, Cats would be considered a repetition.
- If an examinee uses a word in a diminutive and full form (e.g. Dog, Doggy, Doggo), award 1 mark for the first word and 0 for the subsequent words. These are repetitions.

- If an examinee says the same animal word with a different adjective in front, consider only the animal word on its own. Either the unique animal word or the first adjective + animal word combination (depending on which is first) will be awarded the mark and subsequent responses will be considered repetitions and awarded 0. For example, if an examinee said big bear, bear and small bear only big bear would receive one mark. The exception is if the adjective differentiates that animal into a different species. For example, brown bear, black bear and polar bear would each uniquely score 1 mark.

Overall Score

- Sum the number of unique correct responses.
- Convert raw scores to semantic fluency scores using table 4.7 and 4.8.
- 7 points can be awarded in total.

*Table 4.7
Conversion of raw scores for semantic fluency for 5Y0M – 11Y11M*

Number of Correct Responses	Semantic Fluency Score
≥18	7
14 – 17	6
11 – 13	5
8 – 10	4
6 – 7	3
4 – 5	2
2 – 3	1
0 – 1	0

*Table 4.8
Conversion of raw scores for semantic fluency for 12Y0M – 16Y11M*

Number of Correct Responses	Semantic Fluency Score
≥20	7
14 – 19	6
11 – 13	5
8 – 10	4
6 – 7	3
4 – 5	2
2 – 3	1
0 – 1	0

4.8 Delayed Memory

Examinees are required to name the three words/pictures that were provided in the registration subtest.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital visual stimuli booklet 5Y0M – 11Y11M.

Item Administration

For ages 5Y0M – 11Y11M

Free recall

Say **Do you remember the 3 words I told you towards the start of the tests?** Do not give any prompts. Record verbatim answers.

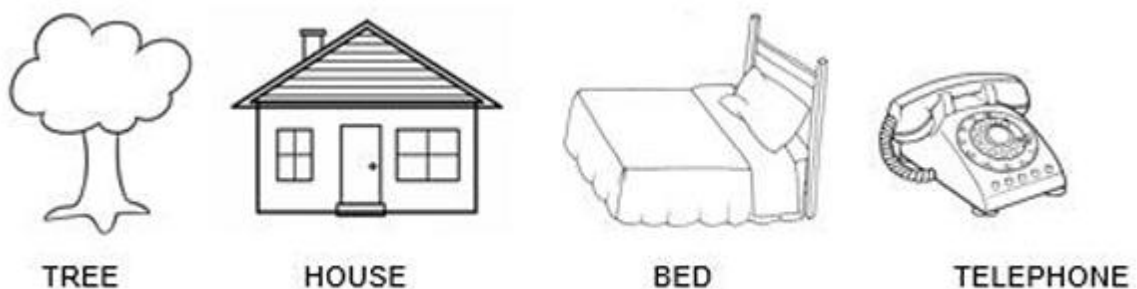
Correct answer [Bed, Shoe, Train].

Recognition

Only administer if one of the items in free recall was recalled incorrectly.

Turn to page 8 and say **can you see any of the pictures that we looked at towards the start?** Record the responses provided by the examinee.

Figure 4.7
Stimuli required for the delayed memory subtest



Correct answer [Bed, Shoe, Train].

For ages 12Y0M – 15Y11M

Say **Do you remember the 3 word I told you towards the start of the test?** Do not give any prompts. Record verbatim answers.

Correct answer [Bed, Shoe, Train].

Scoring

For ages 5Y0M – 11Y11M

- Score 2 points for each freely recalled item.
- Score 1 point for each item correctly recognised when the pictures are shown.
- Score 0 points for anything else.
- Children can score either 0, 1 or 2 points for each item.
- 6 points can be awarded in total.

For ages 12Y0M – 15Y11M

- Score 2 points for each freely recalled item.
- Score 0 points for anything else.
- Children can score either 0 or 2 points for each item.
- 6 points can be awarded in total.

4.9 Immediate Memory

Examinees are shown some pictures or hear some words and are asked to immediately recall what was provided.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital visual stimuli booklet 5Y0M – 11Y11M.

Item Administration

For ages 5Y0M – 11Y11M

Turn to page 10 of the digital visual stimuli booklet 5Y0M – 11Y11M and position in front of the view of the examinee.

Say, **This is Michael look at him closely as I am going to ask you some questions?** (pause). **Can you tell me one thing Michael was wearing?** Circle the response the examinee gives [possible answers: Shorts, Jumper, Shoes/Trainers, socks]. **Can you tell me the colour of something else he was wearing?** Circle the response the examinee gives [possible answers: blue, white]. **Can you tell me what sport he was playing?** Circle the response the examinee gives [possible answers: football].

*Figure 4.8
Stimuli required for the immediate memory task*



Remove visual stimuli book and say **Can you repeat those three things 3 times for me? Try and remember them for later.**

Record examinees response.

For ages 12Y0M – 16Y11M

Say I'm going to tell you some things about a man and I'd like you to repeat his name, favourite food and favourite sport after me 3 times, and remember them.

Say the following three words with a 1-second interval between each word **Michael Rogers, Pizza, Football.**

Record examinees response.

Scoring

- Score 1 point for each correct word in each category for the **1st repetition only.** Do not award points for subsequent repetitions.
- Score 0 points for any incorrect word said.
- 3 points can be scored in total.

4.10 Visual Memory

Examinees are shown four pictures and asked to try to remember these.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital visual stimuli booklet 5Y0M – 11Y11M **or** Digital visual stimuli booklet 12Y0M – 16Y11M.

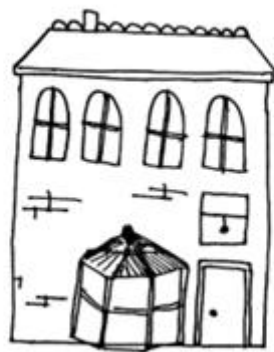
Item administration

Say I'm going to show you four pictures. Later I am then going to mix them up, and I'd like you to pick them out of a bigger group of pictures, so look at them carefully.

Turn to page 12 in digital visual stimuli booklet 5Y0M – 11Y11M or page 6 in digital visual stimuli booklet 12Y0M – 16Y11M. Show each item for five seconds before turning the page.

For each image confirm with patient that the slide has changed.

*Figure 4/9
Example item on the visual memory task*



Note: This subtest does not have any scoring so proceed to next subtest.

4.11 Language Production

Examinees are shown some pictures and are asked to create a short verbal story regarding them.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital visual stimuli booklet 5Y0M – 11Y11M **or** Digital visual stimuli booklet 12Y0M – 16Y11M.

Item Administration

For ages 5Y0M – 11Y11M

Turn to page 17 in the age-appropriate digital visual stimulus booklet and say **These pictures tell a story. Could you tell me what they are doing or what the story is?** Record verbatim responses.

*Figure 4.10
Example item on the language production task*



If a child appears stuck on how to respond include extra prompts like **where are they?** Record when these prompts are used.

There is no time limit for this task.

For ages 12Y0M – 16Y11M

Turn to page 11 in the age-appropriate digital visual stimulus booklet and say **These pictures tell a story. Could you tell me what they are showing or what the story is?** Record verbatim responses.

If a child appears stuck on how to respond include extra prompts like **where are they?** Record when these prompts are used.

There is no time limit for this task.

Scoring

- 1 point is awarded for good detail (goes beyond basic description and includes abstract details – i.e. 0 points for the girl is there and there are penguins. 1 point for the girl is at the zoo where there are parents).
- 1 point is awarded for good structure. (no grammatical errors, sentence structure is logical and follows typical rules).
- 1 point is awarded for full sentences.
- 3 points can be awarded in total.

4.12 Verbal Comprehension

Examinees are told a series of short sentences and asked to repeat them verbatim.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.

Item Administration

Say **Can you repeat the following sentences exactly how I say them.**

Administer each item in a normal reading voice and allow the examinee to respond before continuing to the next item.

Scoring

- Award one point for any response that contains an underlined word.
- Award one point for any response that repeats the sentence verbatim.
- 12 points can be awarded in total.

Table 4.9
Scoring guidance for the verbal comprehension

-
- | | |
|-----|--|
| 7. | Sleep well |
| 8. | The dogs run home |
| 9. | The cat saw the buttercup |
| 10. | Bob drove the tractor home |
| 11. | The caterpillar ate the leaf for lunch |
| 12. | Lucy used the computer for her homework |
-

4.13 Naming

Examinees are asked to name some pictures.

Materials

You will need:

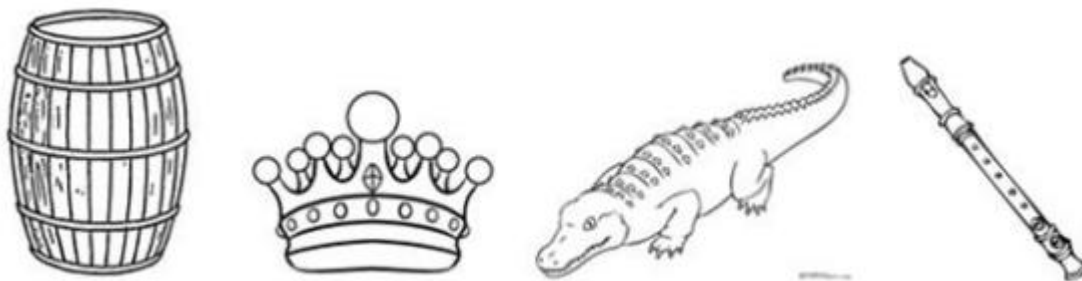
- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital visual stimuli booklet 5Y0M – 11Y11M **or** Digital visual stimuli booklet 12Y0M – 16Y11M.
- Timer

Item Administration

Turn to page 19 in the digital visual stimuli booklet 5Y0M – 11Y11M or page 13 in the digital visual stimuli booklet 12Y0M – 16Y11M.

Say **Can you name these items?** Begin timing. Point to each item starting with the top left, moving across rows from left to right, top to bottom. Record whether the child correctly names the item.

*Figure 4.11
Example items in the naming subtest*



No prompts or cue are permitted.

Record the time taken to complete naming.

Scoring

- Score 1 point for each correctly named item.
- Score 0 points for items named incorrectly.
- 12 points can be awarded in total.

4.14 Semantic Knowledge

Examinees are asked to identify which picture belongs to a specific category.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital visual stimuli booklet 5Y0M – 11Y11M **or** Digital visual stimuli booklet 12Y0M – 16Y11M.

Item administration

Turn to page 19 in digital visual stimuli booklet 5Y0M – 11Y11M or page 13 in digital visual stimuli booklet 12Y0M – 16Y11M.

Say **Can you** (read item verbatim). Read at a normal reading pace.

Scoring

- Score 1 point for each correctly identified item
- Score 0 points for anything else.
- 4 points can be awarded in total.

Table 4.10
Scoring guidelines for the semantic knowledge subtest

Question	1 point answer
Tell me which one is to do with royalty	Crown
Tell me which one is a reptile	Crocodile
Tell me which one is found in Australia	Kangaroo*
Tell me which one is to do with literacy	Book

*If a child says Crocodile or penguin, prompt with **Any other animals that live in Australia**

4.15 Reading

Examinees are required to read some words or letters.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital visual stimuli booklet 5Y0M – 11Y11M **or** Digital visual stimuli booklet 12Y0M – 16Y11M.

Item administration

For ages 5Y0M – 11Y11M

Turn to page 21 in digital visual stimuli booklet 5Y0M – 11Y11M and say, **Can you read the following letters out loud?** Point to each word and record whether the examinee says the letters correctly.

For ages 12Y0M – 16Y11M

Turn to page 15 in digital visual stimuli booklet 12Y0M – 16Y11M and say, **Can you read the following words out loud?** Point to each word and record whether the examinee says the word correctly.

Scoring

- Score 1 point if all four letters/words are pronounced correctly.
- Score 0 points if even one letter/word is not pronounced correctly.
- 1 point can be awarded in total.

4.16 Picture Copying

Examinees must copy a series of images as accurately as they possibly can.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital visual stimuli booklet 5Y0M – 11Y11M or Digital visual stimuli booklet 12Y0M – 16Y11M.

The examinee will need:

- A pencil
- Paper to draw

Item Administration

Turn to page 23 of Digital visual stimuli booklet 5Y0M – 11Y11M or page 17 of digital visual stimuli booklet 12Y0M – 16Y11m. The examinee should not be able to see any of their previous marks.

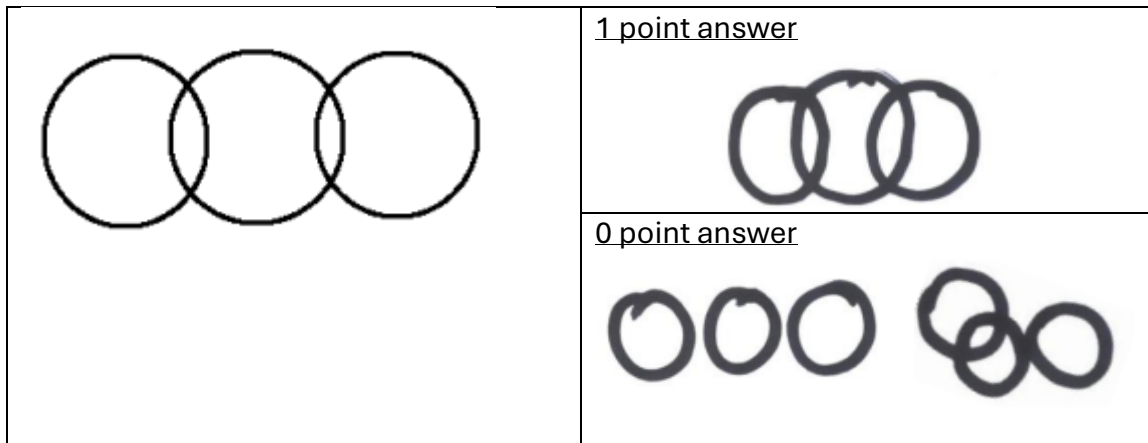
Say, **Using your pen and paper can you draw this image and hold it up to the camera to show me?** Draw their response in the record form and repeat this for both images.

If the child appears to rush say, **there is no time limit so you can take your time to get the picture right.**

Scoring

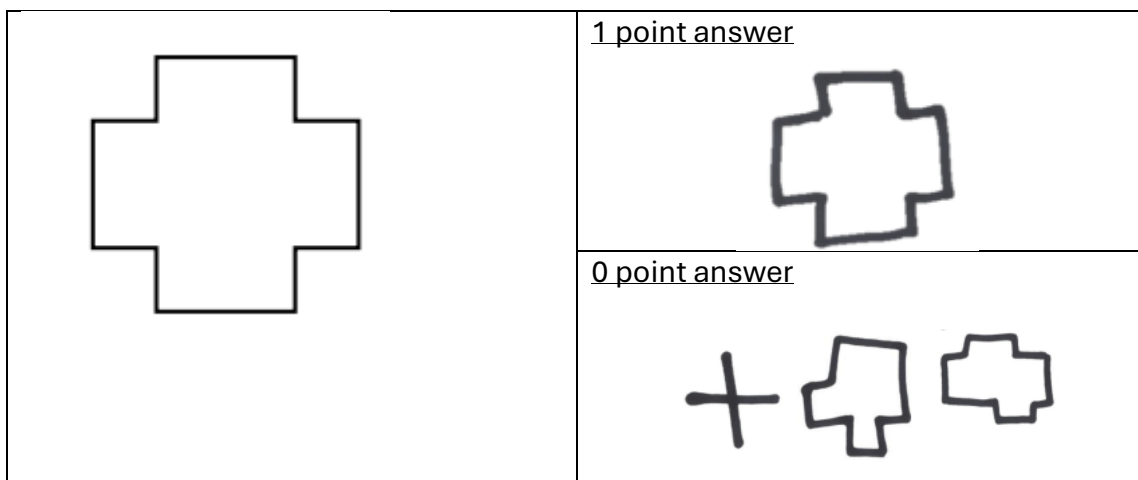
- Score 1 point for shape 1 if exactly 3 circular figures on a horizontal axis are present with no major distortions. The left and right cannot touch but must overlap with the central circle.
- Score 0 for shape 1 for anything else

Figure 4.12
Scoring guidance for item 1 on the picture copying subtest



- Score 1 point for shape 2 if a 2-dimensional cross figure is present. No major distortions are allowed and the horizontal and vertical areas of the cross must be roughly parallel to the opposite and horizontal vertices arms.
- Score 0 points for shape 2 if anything else.

Figure 4.13
Scoring guidance for item 2 on the picture copying subtest



- 2 points can be awarded in total.

4.17 Jigsaw Cancellation

Examinees must identify as many of the target shape that is hidden amongst different and rotated shapes.

Materials

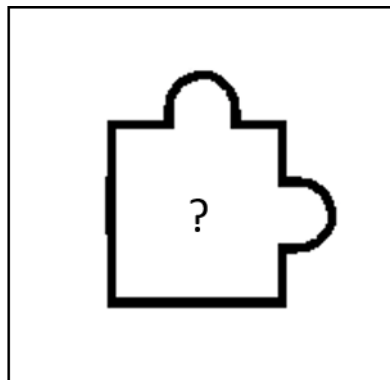
You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital Visual stimuli booklet 5Y0M – 11Y11M **or** Digital Visual stimuli booklet 12Y0M – 16Y11M.
- Timer

Item Administration

Turn to page 26 in digital visual stimuli booklet 5Y0M – 11Y11M or page 21 in digital visual stimuli booklet 12Y0M – 16Y11M.

*Figure 4.14
Target item in Jigsaw Cancellation*



Say **I am going to show you a number of jigsaw pieces. In each jigsaw piece there is a letter, I would you to shout out the letter in any of the pieces that look like the jigsaw piece in the box. Lets have a practice.**

Allow the examinee to respond by verbally saying the letter of the shape they think is the same as the jigsaw piece in the box. It is permitted to give the prompt **Only mark the shapes that are turned the same way as this piece in the box.**

The correct answer is B and D.

Figure 4.15
Example of correctly performed practice trial in jigsaw cancellation



After the practice,

Say **There will be two slides of jigsaw pieces. You will have 15 seconds to do each, so I would like you to try and do this as quickly as you can without making mistakes.** Move to the next page and ask the patient to confirm the slide change, then start the timer.

After 15 seconds has passed say **Stop!**

Scoring

- Total up the number of correct responses. These are shapes that match the target.
- Total up the number of incorrect responses including target shapes that orientated incorrectly.
- Convert raw scores into eC-COSI variants.

Table 3.11
Scoring conversion for the eC-COSI-A and eC-COSI-Y jigsaw cancellation

eC-COSI-Y				eC-COSI-A			
Slide 1 correct		Slide 2 correct		Slide 1 Correct		Slide 2 Correct	
K, B, G, L, R, A, C, M, S, Q		C, A, N, L, G, D, B, R, T, U		G, C, H, Y, P, D, B, Z, I, F, K, S		R, V, H, Y, K, J, F, L, T, P, I, X	
Correct Raw	Correct CCOSI	Incorrect Raw	Incorrect C-COSI	Correct Raw	Correct CCOSI	Incorrect Raw	Incorrect C-COSI
19 – 20	4	0	2	23 – 24	4	0	2
15 – 18	3	1 – 3	1	19 – 22	3	1 – 3	1
11 – 14	2	>3	0	16 – 18	2	>3	0
8 – 10	1			13 – 15	1		
<8	0			<13	0		

- Sum the eC-COSI correct score and eC-COSI incorrect score.
- 6 points can be awarded in total.

4.18 Dot Counting

Examinees are required to identify how many targets shapes are present without pointing.

Materials

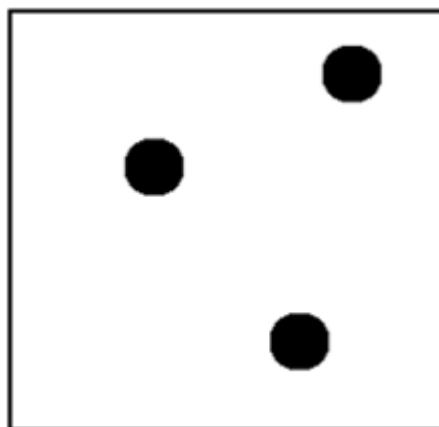
You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital visual stimuli booklet 5Y0M – 11Y11M **or** Digital visual stimuli booklet 12Y0M – 16Y11M.

Item Administration

Turn to page 26 in visual stimuli booklet 5Y0M – 11Y11M or page 24 in digital visual stimuli booklet 12Y0M – 16Y11M. Say, **I am going to show you some dice. Can you count the dots without pointing?** Record the response.

Figure 4.16
Sample Item on dot counting



Repeat for items 2 and 3, eliminating the instructions if the child understands.

Scoring

- Score 1 point for the correct response.
- Score 0 points for any other response.
- 3 points can be awarded in total.

Table 4.12
Scoring conversation for eC-COSI-Y and eC-COSI-A dot counting

Item	Correct answer - eC-COSI Y	Correct answer - eC-COSI A
1	3	5
2	5	7
3	4	6

4.19 Silhouettes

Examinees are asked to identify what the blacked-out objects shown are.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital visual stimuli booklet 5Y0M – 11Y11M **or** Digital visual stimuli booklet 12Y0M – 16Y11M.

Item Administration

Turn to page 30 in digital visual stimuli booklet 5Y0M – 11Y11M or page 24 in digital visual stimuli booklet 12Y0M – 16Y11M. Say, **Can you tell me what these objects are?** Record the responses on the record form.

*Figure 4.17
Sample items on silhouettes*



Scoring

- Score 1 point for the correct response.
- Score 0 points for any other response.
- 4 points can be awarded in total.

4.20 Delayed Memory II

Examinees are required to recall what they can about what they heard/saw in the immediate memory subtest.

Materials

You will need:

- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.

Item Administration

For ages 5Y0M – 11Y11M:

Free Recall

Say **Can you remember the boy I told you about earlier? Can you tell me everything you remember about him?**

Record verbatim responses

Cued recall

Only administer cued recall if 1 or more of the free recall answers are incorrect.

Say **What was he wearing?** Record response. **What was the colour?** Record response **What was the sport?** Record response.

If there are any omission or errors using these prompts, provide all choices for the category.

Say **Was he wearing a – Wolly Hat, - Short/Jumpers/Shoes** (pick the option the examinee used in the immediate recall subtest), **or - Trousers** correct answer: [short/Jumpers/Shoes].

Say **Was the colour a – Blue/White** (pick the option the examinee used in the immediate recall subtest) – **Red, or - Green** correct answer: [Blue/White].

Say **Was he playing a – Golf, - Rounders, or -Football** correct answer: [football].

Records responses.

For ages 12Y0M – 16Y11M:

Free Recall

Say **Can you remember the man I told you about earlier? Can you tell me everything you remember about him?**

Record verbatim responses

Cued recall

Only administer cued recall if 1 or more of the free recall answers are incorrect.

Say **What was his name** Record response. **What was the food?** Record response
What was the sport? Record response.

If there are any omission or errors using these prompts, provide all choices for the category.

Say **Was he named – Michael Rodgers, - Ian Willow or - Harry Lane.** correct answer: [Michael Rodgers].

Say **Was the food – Ice-cream, - Pizza or - Sandwiches.** correct answer: [Pizza].

Say **Was he playing a – Golf, - Rounders, or -Football** correct answer: [football].

Records responses.

Scoring

- Score 2 points for each correct free recall response.
- Score 1 point for each total cued response, if administered.
- Score 0 points for incorrect responses.
- Sum the number of free recall and cued recall responses.
- 6 points can be awarded in total.

4.21 Visual delayed Memory

Examinees are required to recall what they were shown in the visual memory subtest.

Materials

You will need:

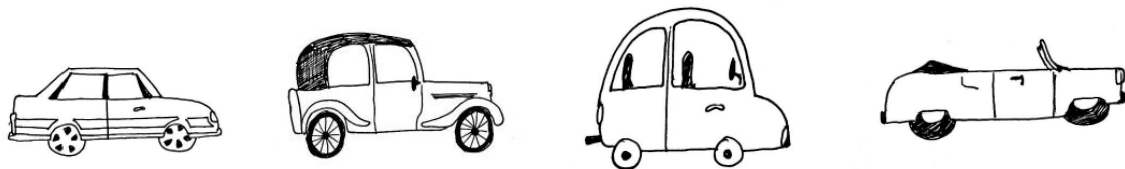
- Record form 5Y0M – 11Y11M **or** Record form 12Y0M – 16Y11M.
- Digital visual stimuli booklet 5Y0M – 11Y11M **or** Digital visual stimuli booklet 12Y0M – 16Y11M.

Item Administration

Turn to page 36 in digital visual stimuli booklet 5Y0M – 11Y11M or page 30 in digital visual stimuli booklet 12Y0M – 16Y11M.

Say **I showed you four pictures earlier. Can you pick them out of all these pictures? Which car did I show you?** Record response.

Figure 4.18
Sample targets on visual delayed memory



Turn the page and say **which table did I show you?** Record response.

Turn the page and say **which house did I show you?** Record response.~

Turn the page and say **which teapot did I show you?** Record response.

Scoring

- Score 1 point for each object identified correctly. Correct answers are in bold.
- Score 0 points for any other answer.
- 4 points can be awarded in total.

Table 4.13
Scoring matrix for visual delayed memory

Which car?	1	2	3	4	5
Which table?	1	2	3	4	5
Which house?	1	2	3	4	5
Which teapot?	1	2	3	4	5

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