

Product Overview: CANTAB Connect Research

V10.0



CANTAB Connect Research

Expert cognitive research made easier.

CANTAB Connect Research is the quick and simple-to-use assessment system providing highly validated touchscreen tests of cognition.

Our standardised test batteries can assess memory, executive function, attention and processing speed, making CANTAB Connect Research ideal for a range of disease areas. For more information on disease and research areas we recommend for CANTAB Connect, [see our Test Selector](#).

CANTAB Connect Research technology makes it easy to perform high quality studies, enabling researchers to produce world-leading cognitive science.



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Product Description

CANTAB Connect Research is a cloud-based product that includes a combination of up to sixteen tests to assess cognition in research studies. The tests are all standardised, including automated voiceover instructions. This reduces the burden of test administration and helps to ensure consistent testing between sites and researchers in larger studies. In addition, the predominantly nonverbal nature of the tests minimise the risk of errors arising from differences in language or cultural understanding. The test variants available make the product suitable for both impaired patients and high functioning individuals.

CANTAB Connect does not currently have normative data built into the product. Researchers should always, where possible, recruit a suitable control group for all research. Watch our video on [why normative data should not be used to replace a control group when conducting research](#).

The cloud technology of CANTAB Connect enables automatic backup of data, which can be accessed from anywhere in the world at any time. Data from studies is also synchronised across sites and hardware systems, facilitating larger scale studies.

CANTAB Connect Research is a fixed product; the test variants, outcome measures available and the output format is standardised.

Web-based testing

CANTAB Connect Research assessments can also be conducted remotely (for example at home) using the CANTAB Connect web-based testing platform. This is currently available for the CANTAB **Paired Associates Learning, Spatial Working Memory, Rapid Visual Information Processing, Pattern Recognition Memory** and **One Touch Stockings of Cambridge** tests. Please [contact us](#) for more information on web-based testing.

Hardware

Lab-based assessments are validated for Apple iPads. Please [contact us](#) for information about other validated devices and devices that can be used for web-based assessments.

Key Features

- Tests can cover the domains of attention, memory, executive function, decision making and social cognition.
- Test panels can be used in patient populations and healthy volunteers.
- Automated and standardised test administration and data collection.
- Immediate, secure data storage, real-time data access and abilities to record performance observations.

Key Advantages

- Easy to understand science.
- High quality data.
- Study workloads and costs are greatly reduced, enabling faster, easier and more accurate data collection.
- Data can be efficiently and reliably captured and reviewed.

Pricing and Licensing

One CANTAB Connect Research license will allow you to configure multiple studies to your exact requirements, and can be run on an unlimited number of iPads. The licensing for CANTAB Connect Research is calculated on a per-assessment basis whereby one assessment is any subject being tested at one time-point using your pre-determined test battery. The licenses are unrestricted by time which means you can continue to use the software even if your study experiences delays. An additional fee is payable to enable web-based testing.

Key terms

Assessment

A visit (see below) that has been completed once is equivalent to a single assessment. If the same subject completes a visit twice, this will use two assessments. You can determine the number of assessments you need by thinking about **how many subjects** you will be having and **how many visits** each subject will be completing.

Visit

A subject completing a cognitive test or set of cognitive tests at a single time point is defined as a visit. The number of time points at which you wish to assess subjects will define how many visits your study will have. The **same cognitive test may not be completed more than once** by a subject in a single visit. The tests occurring in the visit(s) in a study are defined in the Admin application and can be chosen from the tests you have purchased on your license.

Test

'Tests' are the CANTAB cognitive tests that subjects complete during a visit, each of which taps into a specific area of cognitive function. Tests may not be duplicated within a single visit. The various tests that are available can be found here, organised according to the cognitive domain which they measure:

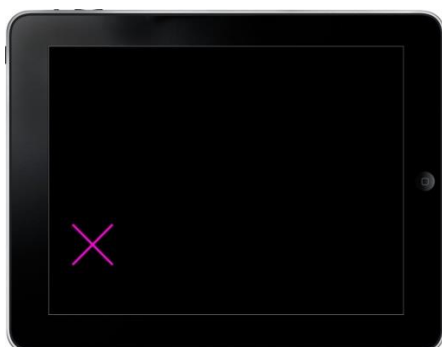
<http://www.cambridgecognition.com/cantab/cognitive-tests/>.

Test Panel Overview

Familiarisation Test

Motor Screening Task (MOT)

MOT provides a general assay of whether sensorimotor or comprehension difficulties limit collecting valid data from the subject.



Subjects must touch the flashing cross which is shown in different locations on the screen. The test has two outcome measures which measure the subject's speed of response and the accuracy of the subject's pointing.

Information Input

Reaction Time (RTI)

RTI provides assays of motor and mental response speeds, as well as measures of movement time, reaction time and response accuracy.



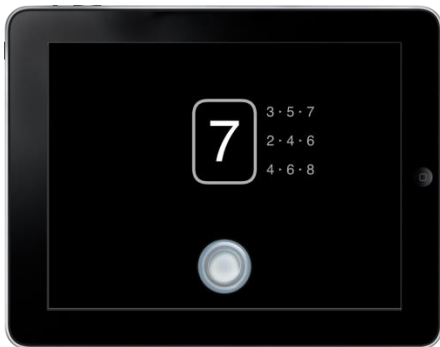
In this five-choice reaction time test the subject must press and hold down a touchscreen button at the bottom of the screen. A yellow spot will appear inside one of five yellow circles at the top of the screen. Subjects must respond to the spot as quickly as they can by letting go of the button and touching the circle where the yellow spot appeared. This is repeated for 30 trials. Practice trials are available to familiarise subjects with the test.

The eleven outcome measures in RTI include reaction times, movement times, and error scores.

Rapid Visual Information Processing (RVP)

Available for web-based testing

RVP is a sensitive tool for assessment of sustained attention.



Single digits appear one at a time at a rate of 100 digits per minute. Subjects must detect a series of target sequences (e.g. 3-5-7) and touch a button when they see the last digit of a target sequence. Nine target sequences appear every 100 numbers. Performance on the RVP test has been shown to be associated with activation in a network of brain structures including the frontal and parietal lobes (Coull et al., 1995).

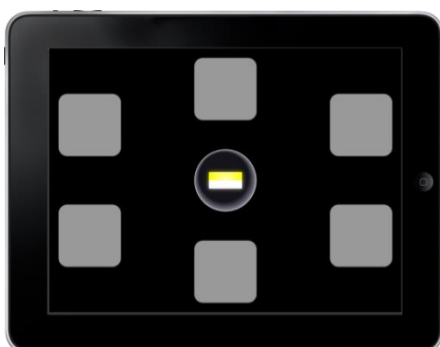
Key outcome measures include RVP A prime, a signal detection measure of target sensitivity and RVP median response latency

Information Storage

Paired Associates Learning (PAL)

Available for web-based testing

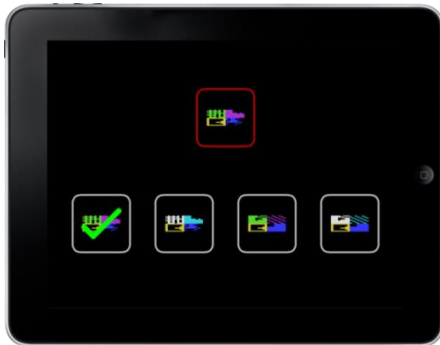
PAL assesses visual memory and new learning, and is a sensitive tool for accurate assessment of episodic memory.



Boxes are displayed on the screen and open one by one in a randomised order to reveal patterns hidden inside. The patterns are then displayed in the middle of the screen, one at a time, and the subject must touch the box where the pattern was originally located. If the subject makes an error, the patterns are re-presented to remind the subject of their locations. Practice trials with fewer patterns are available to familiarise subjects with the test.

Delayed Matching to Sample (DMS)

DMS is a test of attention and recognition. It measures subjects' ability to match a target pattern to four samples, both simultaneously (the target pattern is still displayed on the screen) and after delay.



This test assesses visual matching ability and visual recognition memory. The subject is shown a complex visual pattern and then after a brief delay, four patterns. The subject must touch the pattern that matches the sample. In some trials the sample and the choice patterns are shown simultaneously, whereas in others there is a delay (of 0, 4 or 12 seconds) before the four choices appear.

Pattern Recognition Memory (PRM)

Available for web-based testing

PRM is a measure of visual recognition memory.

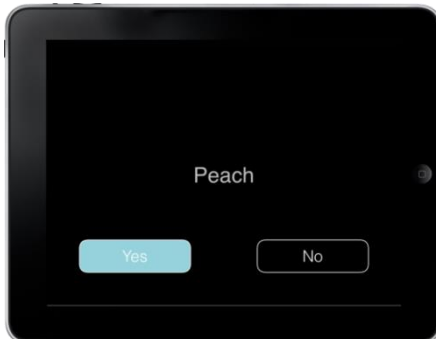


The subject's watch a series of 12 patterns appear, one at a time, on the screen. These patterns are designed so that they cannot be given verbal labels. In the recognition phase, the subject chooses which two patterns they have already seen before.

This is then repeated, with a new set of 24 patterns to be remembered.

Verbal Recognition Memory (VRM)

VRM measures the ability to encode and subsequently retrieve verbal information.



This test can contain 3 elements: a presentation phase, a free recall phase and a recognition phase. The subject is initially shown a list of words which they are required to remember. If a free recall phase is included, the subject must then say the words they remember seeing while the experimenter logs what words are spoken. A forced choice recognition phase can then be selected, asking the subject to say whether they remember seeing the word on screen before. The word can be one of the originals, or a new word (distractor) which they have not yet seen before.

Using Information to Guide Behaviour

Multitasking Test (MTT)

MTT is a test of executive function which provides a measure of the ability to use multiple sources of potentially conflicting information to guide behaviour.

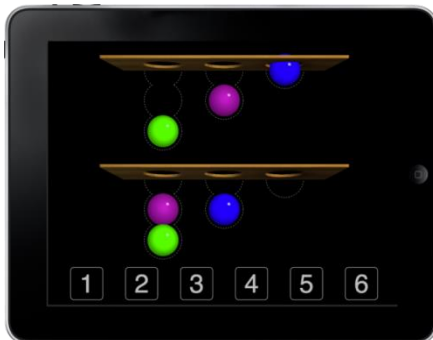


On each trial, an arrow appears on the right or on the left hand side of the screen, and the subject is asked to make a right or left response. During training stages, subjects learn to either respond according to the direction of the arrow, or according to the side of the screen on which it appears. During the assessed stage, each trial is preceded by a cue indicating whether the subject should respond according to direction or side. In some sections of the test the same rule is applied consistently across trials, whereas in the final phase the rules are intermixed in a randomised manner. For some trials, the arrow's direction and side are incongruent.

From this it is possible to calculate the cost of using intermixed rules versus consistent rules, and incongruent information versus congruent information.

One Touch Stockings of Cambridge (OTS)

OTS is a test of executive function, planning and working memory based upon the 'Tower of Hanoi'.

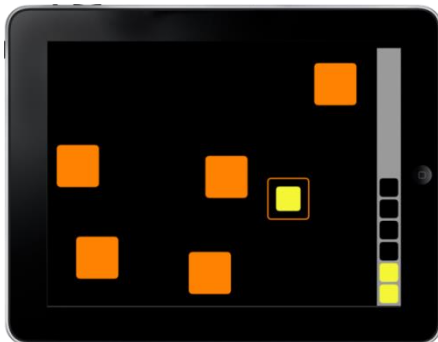


The subject sees two displays containing three coloured balls and must work out in their head how many 'moves' would be required to make the lower display match the upper display. Latency and accuracy measures are calculated.

Spatial Working Memory (SWM)

Available for web-based testing

SWM requires retention and manipulation of visuospatial information. This test has notable executive function demands, and measures strategy use as well as errors.

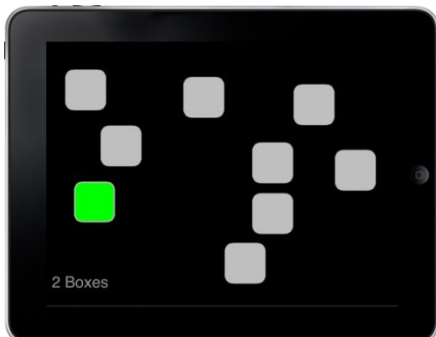


The test begins with coloured boxes being shown on the screen. The aim of this test is that, by touching the boxes and using a process of elimination, the subject should find one 'token' in each of the boxes and use them to fill up an empty column on the right hand side of the screen. The key test instruction is that the computer will never hide a token in the same coloured box, so once a token is found in a box the subject should not return to that box to look for another token. The colour and position of the boxes used are changed from trial to trial to discourage the use of stereotyped search strategies.

The key outcome measures for SWM include errors (touching boxes that have been found to be empty and revisiting boxes which have already been found to contain a token) and strategy, a measurement of executive function.

Spatial Span (SSP)

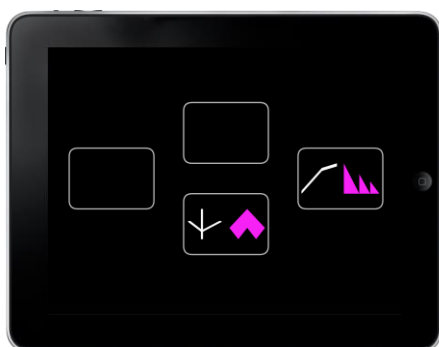
SSP is a test of visuospatial working memory.



In this test, based on the Corsi block tapping test, white squares briefly change colour in a variable sequence. The subject must remember the sequence and then touch the squares in that same order. The sequence length increases throughout the test. There are up to 3 attempts at each sequence length and the test terminates if all three are failed.

Intra-Extra Dimensional Set Shift Task (IED)

IED assesses attentional set formation, maintenance and shifting.



In this test, subjects must use feedback to work out a rule that determines which stimulus is 'correct'. After six correct responses, the stimuli and/or rule changes. Initially the test will involve simple stimuli which are made up of just one of the dimensions e.g. two block pink shapes that differ in form. Later on in the test, compound stimuli are used: white lines overlaid on the pink shapes.

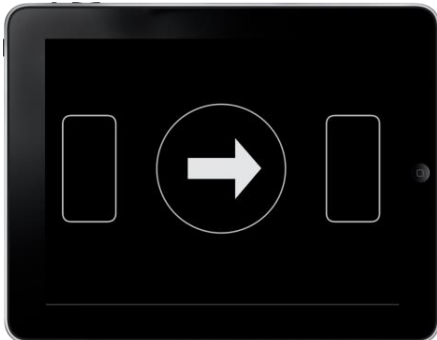
The shifts in rule are initially intra-dimensional (e.g. the pink shapes remain the only relevant dimension) and then later extra-dimensional (e.g. white lines become the relevant dimension).

The test is based on Wisconsin Card Sorting Test, but has the advantage that it uses abstract stimuli, does not involve a match-to-sample component and tests the subject with novel exemplar.

We do not recommend IED for repeat testing, given that it tends to display significant learning effects.

Stop Signal Task (SST)

SST is a test of impulse control and response inhibition.

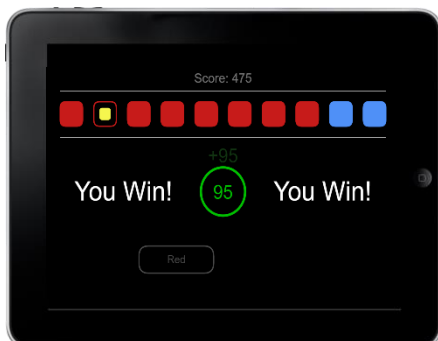


The subject sees an arrow appear on screen facing either left or right. Initially the subject learns to select the corresponding button on each side of the screen depending on the direction of the arrow.

After this learning phase, the subject is introduced to a beep which signals to the subject not to make any response. The delay between the presentation of the arrow and the sound of the beep (stop-signal delay) is variable, preventing prediction and helping to assess the time point where action cancellation is possible, before it becomes a ballistic process.

Cambridge Gambling Task (CGT)

CGT is a test of decision making and risk taking behaviour outside a learning context.

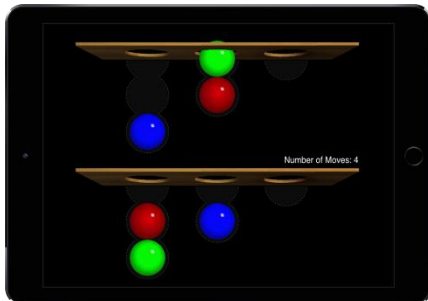


The subject is presented with a row of ten boxes across the top of the screen: some are red and some are blue. Subjects must decide whether they think a yellow token is in a red or blue box, and bet on this decision.

Risk taking and impulsivity are differentiated by observing differences in behaviour in the ascending and descending bet trials. In the ascending bet trials, a subject must delay their response if they wish to place a high-value, and therefore high-risk, bet while the opposite is the case for descending bet trials.

Stockings of Cambridge (SOC)

SOC assesses spatial planning and requires individuals to use problem-solving strategies to match two sets of stimuli.



The subject is shown two displays. In each of these displays, three stockings - containing three coloured balls - are suspended from a beam. The two displays appear at the top and bottom of the screen. The balls are arranged in different patterns in each display.

The subject must move the balls in the bottom display to copy the pattern shown in the top display. The balls are moved one at a time by selecting the required ball, then selecting the position to which it should be moved. The subject is instructed to make as few moves as possible to match the two patterns.

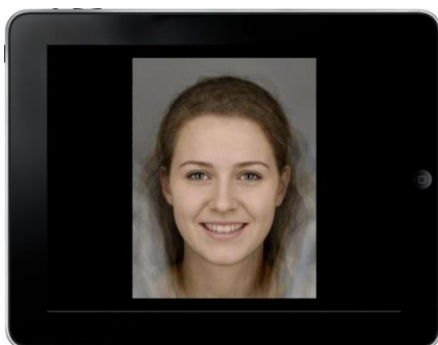
In a distinct phase of the test, subjects are instructed to copy the moves the computer makes. These moves mimic the moves the subject made, and allow movement time to be discounted from thinking time measures.

Social Cognition

Emotion Recognition Task (ERT)

Available for web-based testing

ERT assesses social cognition and measures the ability of the subject to identify emotions in facial expressions.



Computer-morphed images derived from the facial features of real individuals, each showing a specific emotion, are displayed on the screen one at a time. Each face is displayed for 200ms and then immediately covered up to prevent residual processing of the image. The subject must select which emotion the face displayed from 6 options (sadness, happiness, fear, anger, disgust or surprise).

Languages

Number	Language	Test availability
1.	Afrikaans	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
2.	Brazilian Portuguese	All tests except Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
3.	Bulgarian	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
4.	Czech	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
5.	Danish	All tests except Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
6.	Dutch	All tests except Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
7.	English (US)	All tests
8.	European Spanish	All tests except Cambridge Gambling Test (CGT), Intra-Extra

		Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
9.	Estonian	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
10.	Finnish	All tests except Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
11.	French	All tests except Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
12.	German	All tests except Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
13.	Gulf Arabic (Khaliji)	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
14.	Hebrew	All tests except Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
15.	Hungarian	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)

16.	Israeli Arabic	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
17.	Italian	All tests except Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
18.	Japanese	All tests except Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
19.	Korean	All tests except Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
20.	Latin American Spanish	All tests except Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
21.	Northern Sotho	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
22.	Norwegian (Bokmål)	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
23.	Polish	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT),

		Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
24.	Romanian	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
25.	Russian	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
26.	Sesotho	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
27.	Slovak	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
28.	Swedish	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
29.	Traditional Chinese (Hong Kong)	All tests except Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
30.	Traditional Chinese (Taiwan)	All tests except Cambridge Gambling

		Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
31.	Turkish	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
32.	Ukrainian	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
33.	Xhosa	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)
34.	Zulu	All tests except Verbal Recognition Memory (VRM), Cambridge Gambling Test (CGT), Intra-Extra Dimensional Set Shift Test (IED) & Stockings of Cambridge (SOC)

Outcome Measures

An Outcome Measures report is available to download directly from CANTAB Connect Research; this report shows only the outcome measures for the tests and variants used in your study. If you would like to see an example of this report and the outcome measures currently available in CANTAB Connect Research, please request a copy from our Customer Services team via support@camcog.com

Test Variants

Some test variants have equivalent ‘tone’ variants. These tone variants have the same structure as their equivalent voice variants. Instead of the instructions being delivered via an automated voiceover, however, the variants are segmented by blank screens. These screens allow the rater to read the instructions to the subject from a script, and progress to the next phase of the test (by pressing a play button), whenever the instructions have been successfully delivered. These variants are aimed at use populations within which the automated voiceover may not be appropriate, such as child and impaired populations.

Test	Variant	Duration	Test Structure	When to Use
Cambridge Gambling Test (CGT)	Ascending First	18 minutes	8 practice trials (4 decision-only and 4 ascending bet practice trials) 36 assessed ascending bet trials 4 descending bet practice trials 36 assessed descending bet practice trials	We recommend this variant is used for cross-sectional studies testing at a single time point. This variant has an identical structure to CANTAB Research Suite.
	Descending First	18 minutes	8 practice trials (4 decision-only and 4 descending bet practice trials) 36 assessed descending bet trials 4 ascending bet practice trials 36 assessed ascending bet practice trials	We recommend this variant is used for cross-sectional studies testing at a single time point. This variant has an identical structure to CANTAB Research Suite.
	Ascending First Shortened	12 minutes	8 practice trials (4 decision-only and 4 ascending bet practice trials) 18 assessed ascending bet trials 4 descending bet practice trials 18 assessed descending bet practice trials	We recommend this variant is used for longitudinal studies testing at multiple time points.
	Descending First Shortened	12 minutes	8 practice trials (4 decision-only and 4 descending bet practice trials) 18 assessed descending bet trials 4 ascending bet practice trials 18 assessed ascending bet practice trials	We recommend this variant is used for longitudinal studies testing at multiple time points.
Delayed Matching to Sample (DMS)	Recommended Standard	7 minutes	4 practice trials (simultaneous, 0, 4, 12 second delays) 20 assessed trials (5 per delay type)	We recommend that this variant is used for all studies.
Emotion Recognition Test (ERT)	Long	9 minutes	5 practice trials 90 assessed trials Male/Female faces	We recommend this variant is used for most studies.

			Caucasian 6 emotions (happiness, sadness, fear, anger, surprise, disgust) 15 intensities	
	Short	6 minutes	5 practice trials 48 assessed trials Male/Female faces Caucasian 6 emotions (happiness, sadness, fear, anger, surprise, disgust) 8 intensities	We recommend this variant where the testing duration needs to be short.
Intra-Extra Dimensional Set Shift Test (IED)	Recommended Standard Shapes First	7 minutes	9 assessed stages ≥6 trials per stage (simple discrimination of shapes, simple reversal of shapes, compound discrimination 1, compound discrimination 2, compound reversal, ID shift, ID reversal, ED shift, ED reversal)	We recommend this variant is used for cross-sectional studies testing at a single time point. This variant has an identical structure and stimuli to CANTAB Research Suite Clinical Mode.
	Recommended Standard Lines First	7 minutes	9 assessed stages ≥6 trials per stage (simple discrimination of lines, simple reversal of lines, compound discrimination 1, compound discrimination 2, compound reversal, ID shift, ID reversal, ED shift, ED reversal)	We recommend this variant is used for cross-sectional studies testing at a single time point. This variant has an identical structure and stimuli to CANTAB Research Suite Clinical Mode.
	Recommended Standard Shapes First Repeated	7 minutes	9 assessed stages ≥6 trials per stage (simple discrimination of shapes, simple reversal of shapes, compound discrimination 1, compound discrimination 2, compound reversal, ID shift, ID reversal, ED shift, ED reversal)	We do not recommend IED for repeated testing, as subjects tend to exhibit significant learning effects. Historically, however, IED has been used for repeat testing in some studies. As such, we recommend this variant is used for longitudinal studies testing at multiple time points.
	Recommended Standard Lines First Repeated	7 minutes	9 assessed stages ≥6 trials per stage (simple discrimination of lines, simple reversal of lines, compound discrimination 1, compound discrimination 2, compound reversal, ID shift, ID reversal, ED shift, ED reversal)	We do not recommend IED for repeated testing, as subjects tend to exhibit significant learning effects. Historically, however, IED has been used for repeat testing in some studies. As such, we recommend this variant is used for longitudinal studies testing at multiple time points.

Motor Screening Test (MOT)	Voice & Tone	2 minutes	3 practice trials 10 assessed trials	We recommend that this variant is used for all studies.
Multitesting Test (MTT)	Standard	8 minutes	8 Direction trials, practice (arrows centred) 8 Direction trials, practice (arrows at sides of screen) 40 Direction trials, assessed 8 Side trials, practice 40 Side trials, assessed 16 Mixed direction & side trials, practice 80 Mixed direction & side trials, assessed	We recommend that this variant is used for all studies.
One Touch Stockings of Cambridge (OTS)	Standard	10 minutes	3 mandatory practice trials (2, 3, 4 moves) 15 assessed trials (1 to 6 moves)	We recommend this variant for most populations, who require the hardest level of difficulty in order to prevent ceiling effects.
	Alternative	8 minutes	3 mandatory practice trials (2, 3, 4 moves) 20 assessed trials (1 to 5 moves)	We recommend this variant for use in impaired populations who might not be able to complete the hardest level of the tests.
Paired Associates Learning (PAL)	Recommended Standard (Voice & Tone)	8 minutes	2 pattern practice 2, 4, 6, 8 patterns assessed (4 attempts)	This is the variant we recommend for use in patient populations, older adults or anybody we expect to exhibit cognitive impairments.
	Recommended Standard Extended (Voice & Tone)	12 minutes	2 pattern practice 2, 4, 6, 8, 12 patterns assessed (4 attempts)	This variant can be used in populations with a wide variance in ability. This variant can be used in impaired populations, but also healthy controls, due to the more difficult stages mitigating ceiling effects.
Pattern Recognition Memory (PRM)	Recommended Standard	5 minutes	12 patterns immediate recognition 12 patterns delayed recognition (20 minutes)	We recommend using this variant with patient populations and/or children.
	Recommended Standard 18 Extended	5 minutes	18 patterns immediate recognition 18 patterns delayed recognition (20 minutes)	We recommend this variant when testing healthy populations or symptom-free older populations.
Reaction Time (RTI)	Five Choice	4 minutes	10 trials, practice (repeated if 3 errors made) 30 trials, assessed	We recommend that this variant is used for all studies.

	Simple and Five Choice (Voice & Tone)	6 minutes	10 simple trials, practice (repeated if 3 errors made) 30 simple trials, assessed 10 five-choice trials, practice (repeated if 3 errors made) 30 five-choice trials, assessed	This variant combines elements of both a simple reaction time test (one response stimulus) and the five choice variants (five response stimuli). This variant is useful in patient populations who may be very impaired.
Rapid Visual Information Processing (RVP)	1 Target	9 minutes	2 minute practice (with 3-5-7) 6 minutes assessed 1 target sequence: 3-5-7	We recommend this variant when testing very impaired patients, or paediatric populations. Subjects are required to detect only one target sequence.
	3 Targets (Voice & Tone)	9 minutes	2 minute practice (with 3-5-7) 6 minutes assessed 3 target sequences: 3-5-7; 2-4-6-; 4-6-8	The recommended variant for testing. The assessed phase is 9 minutes long, and subjects are required to detect three target sequences.
Stockings of Cambridge (SOC)	Recommended Standard (Voice & Tone)	10 minutes	Group 1: Solve phase: 6 practice trials, 6 assessed trials Follow phase: 2 practice trials, 6 assessed trials Group 2: Solve phase: 2 practice trials, 6 assessed trials Follow phase: 2 practice trials, 6 assessed trials	We recommend this variant is used for cross-sectional studies testing at a single time point. This variant has an identical structure to CANTAB Research Suite.
	Recommended Standard Repeated (Voice & Tone)	10 minutes	Group 1: Solve phase: 6 practice trials, 6 assessed trials Follow phase: 2 practice trials, 6 assessed trials Group 2: Solve phase: 2 practice trials, 6 assessed trials Follow phase: 2 practice trials, 6 assessed trials	We recommend this variant is used for longitudinal studies testing at multiple time points.
Spatial Span (SSP)	Standard Forward 2.0 (Voice & Tone)	4 minutes	2 x 2 box sequence practice trials (3 attempts) 8 assessed trials (2-9 box sequences, 3 attempts)	Subjects are required to recall the order that some boxes change colour. This variant can be used in combination with <i>Standard Reverse 2.0</i> , or on its own.

	Standard Reverse 2.0	4 minutes	2 x 2 box sequence practice trials (3 attempts) 8 assessed trials (2-9 box sequences, 3 attempts)	Subjects are required to recall <i>in reverse</i> (last box first) the order that some boxes change colour. This variant can be used in combination with <i>Standard Forward 2.0</i> , or on its own.
Stop Signal Test (SST)	Basic	20 minutes	4 Practice Trials 4 epochs each containing 5 blocks of trials (assessed). Go/Stop trial ratio 3:1	We recommend that this variant is used for all studies.
Spatial Working Memory (SWM)	Recommended Standard 2.0	4 minutes	2 x 3 token practice trials 4, 6, 8 tokens assessed trials	We recommend that this variant is used for all studies.
	Recommended Standard 2.0 Extended (Voice & Tone)	6 minutes	3 token practice 3, 4, 6, 8 12 tokens assessed	This variant can be used in populations with a wide variance in ability. This variant can be used in impaired populations, but also healthy controls, due to the more difficult stages mitigating ceiling effects.
Verbal Recognition Memory (VRM)	Recommended Standard	6 minutes	18-word presentation phase Free recall phase Immediate recognition phase Delayed recognition phase (after 20 minutes)	We recommend that this variant is used in healthy populations. Stimuli are presented for 1000ms.
	Prolonged Display	20 minutes	18-word presentation phase Free recall phase Immediate recognition phase Delayed recognition phased (after 20 minutes)	We recommend that this variant is used in impaired populations. This variant offers a longer stimulus presentation time of 3000ms.
	Prolonged Display Short Version	20 minutes	12-word presentation phase Free recall phase Immediate recognition phase Delayed recognition phased (after 20 minutes)	We recommend this variant in severely impaired populations. This variant offers a longer stimulus presentation time of 3000ms and a reduced number of stimuli.



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