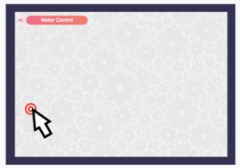
**Supplementary table 1**. Illustration of the tasks' design, stimuli's features, and the performance measures registered for each task.

| Battery | Task | Description | Stimuli Presented | ISI/ms | Amount of time stimulus on screen | Randomisation | Stimuli presentation | End Criteria | Summary Score meaning | Other measures we are looking at with this task |
|---|---|---|---|---|---|---|---|---|---|---|
| A/Final Battery | Motor Control | Participants must click on several targets that appear on the screen at random locations.  | 1 cm-diameter targets | 0 | User response | - | immediate | End of stimuli (human dependent) | accuracy (median Euclidian distance from target) | mean RT |
| A/Final Battery | Simple Reaction Time (SRT) | Participants must respond as quickly as they can to a red target that appears on the screen at different timepoints.  | targets | uniform distribution (500 - 2000) | User response OR 1000ms | - | uniform distribution (500 - 2000) | End of stimuli (task/human dependent) | mean RT | standard deviation of mean RT* |

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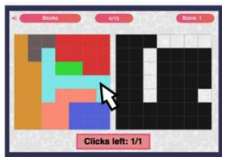
|---|---|---|---|---|---|---|---|---|---|---|
| A/Final Battery | Choice Reaction Time (CRT) | Participants must click left or right as quickly a s possible, depending on a left or right cue.<br>  | right and left arrows | uniform distribution (500 - 2000) | User response OR 1000ms | Random left or right | uniform distribution (500 - 2000) | End of stimuli (task/human dependent) | median RT | total number incorrect trials, standard deviation of median RT |
| A | Blocks | Participants must remove blocks from one array (left) until it matches a target array (right). The Blocks task has been adapted from a common neuropsychological test (1).<br>  | Tetris-like structures | 1000 | User response | - | immediate | End of stimuli (human dependent) | total correct trials | median RT correct |
| A | Odd One Out | This task measures the ability to identify abnormal patterns in a pool of images that follow a central rule. Participants must find the odd one out using shape, number, and colour as criteria.<br>  | images containing patterns of shapes | 1000 | User response | Random selection of stimuli | immediate | All stimuli correct or 3 consecutive incorrect answers | total correct trials | median RT correct (time between the display of the stimulus and the correct identification of the rule breaker) |

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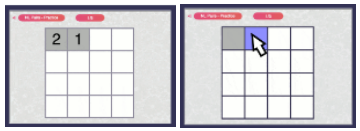
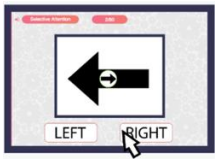
|---|---|---|---|---|---|---|---|---|---|---|
| B | Digit Span | Participants must remember a full string of digits (shown in the left panel) that increments in length by one unit in each trial. Participants have to replicate the sequence of numbers using the keyboard on the right-hand side.  | digits illustrations | 0 | 1500ms | Random string of up to 6 unique digits (repetition of numbers if > 6 correct answers) | immediate | 3 consecutive incorrect answers | total correct trials | - |
| B | Reverse Digit Span | This task is the same as Digit Span, although participants must remember the string of digits in reverse order. The string increments in length by one unit in each correct trial. | digits illustrations | 0 | 1500ms | Random string of up to 6 unique digits (repetition of numbers if > 6 correct answers) | immediate | 3 consecutive incorrect answers | total correct trials | - |
| B | Number Location Pairs | Numbers will appear at specific locations of a 4x4 grid. Participants will be asked to click on the location the numbers appeared at in the right order. The number of digits gets longer as the participant provides a correct answer.  | digits illustrations | - | 1500ms per number in the array | Numbers presented on random squares of the 4x4 grid | immediate | 3 consecutive incorrect answers | total correct trials | - |
| B | Selective Attention | This task is an adaptation of the classic Flanker Task (2). Participants must respond to the direction of a small arrow, whilst ignoring the direction of a larger arrow behind.  | big and small arrows | random selection of 700, 900, 1100 | Big arrow on screen for 300ms then little arrow appears then both are on screen until user response or 3000ms | 5 blocks of 12 trials with 6 congruent and 6 incongruent trials randomly distributed in each block | | End of stimuli (task dependent) | RT cost (mean RT incongruent trials - mean RT congruent trials) | - |

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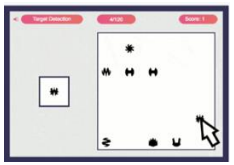
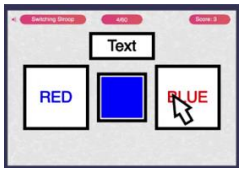
|---|---|---|---|---|---|---|---|---|---|---|
| B | Target Detection | Target Detection measures the ability to identify specific relevant information in the context of many distractions. Participants must identify and click on all the stimuli in the right hand-side panel that match the target showed on the left hand-side panel.  | targets | - | New shapes appear on the screen every 1000ms | - | 1000ms | End of stimuli (task dependent) | total correct trials | RT for total correct responses |
| B | Switching Stroop | Participants must describe the colour of a central tile by choosing between two words reading "Red" and "Blue" and coloured either red or blue. A box will indicate which modality the participant will have to use to provide the answer (i.e., either the text or colour of the words).   | red and blue squares with text in the middle | 0 | User response | 6 blocks of 10 trials with 2 switches randomly placed in each block. Stimuli randomly chosen. | immediate | End of stimuli (human dependent) | Switch cost (Switch - non switch trials) | Switch cost median RT, incongruent cost (congruent - incongruent trials), incongruent cost median RT |
| C /Final Battery | Picture Completion | Participants must correctly assign missing pieces to the empty spaces a picture. The pieces are sometimes rotated through 90, 180 or 270 degrees.  | square fragments of a picture | 0 | User response | Random image selection | immediate | End of stimuli (human dependent) | total errors | duration (total time take) |

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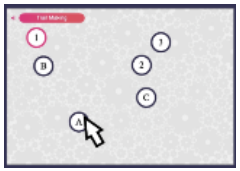
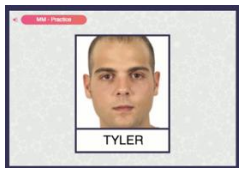
|---|---|---|---|---|---|---|---|---|---|---|
| C /Final Battery | Trail Making Test (TMT) | The TMT is a broadly used neuropsychological assessment of higher order cognitive functions (3). The subject has to link circled numbers in numeric order in part A, and circled numbers and letters in alternating order in part B.  | numbers and letters | - | User response | Random position of numbers and letters on the screen | immediate | End of stimuli (human dependent) | Part B RT - Part A RT (switching cost) | Part A median RT, Part B median RT |
| C /Final Battery | Card Pairs | Participants are shown an array of pairs of identical cards. These cards are then placed face down and participants must remember and identify the location of the identical cards.  | Cards with illustrations | - | 7000ms | Random position of cards on the screen | 7000ms encoding time | End of stimuli (human dependent) | percentage correct answers | duration (total time take) |
| C | Mallas Memory Short | Participants are shown a series of faces paired with names and will have to recall the face-name association. Selecting a name that was neither associated with the target face, nor with any other face shown in the series is considered an error. Selecting a name that is not the one paired with the target face but was linked to one of the faces presented in the series is considered a foil condition.   | faces paired with names | 0 | 3000ms | Faces balanced for gender and race, presented in random order | 3000ms encoding time | End of stimuli (human dependent) | total correct trials | total number of foil errors |

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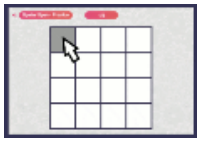
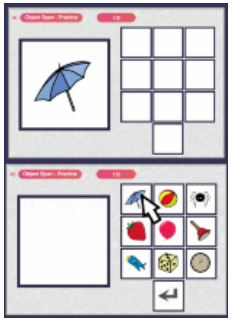
|---|---|---|---|---|---|---|---|---|---|---|
| C | Spatial Span | Participants must remember a string of grey squares appearing at different locations on a grid. The string gets longer as the participant answers correctly. This is a variant on the classic Corsi Block Tapping paradigm (4).  | white tiles which light up | 0 | 1500ms | Random sequence of tiles in a 4x4 grid | immediate | 3 consecutive incorrect answers | total correct trials | - |
| C | Object Span | Participants must remember a sequence of objects showed on the left-hand side of the screen and incrementing in length by one unit in each trial. Participants must replicate the sequence of objects using the digital keyboard on the right-hand side of the screen.  | illustrations of objects | 0 | 1500ms | Random string of up to 10 unique objects (repetition of objects if > 10 correct answers) | immediate | 3 consecutive incorrect answers | total correct trials | - |

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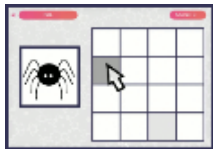
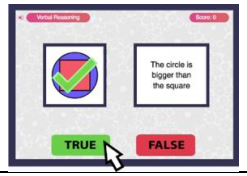
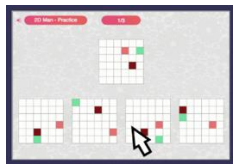
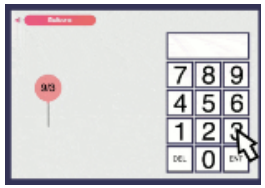
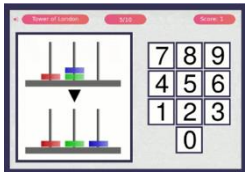
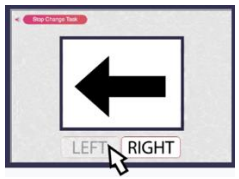
|---|---|---|---|---|---|---|---|---|---|---|
| C /Final Battery | Paired Associates Learning (PAL) | PAL is a variant of the binding paradigm that has previously been used in other clinical populations (5), including TBI (6). Some images are displayed at random locations in a 4x4 grid. Once all images have been revealed and hidden, each object is displayed in the left-hand side panel. Individuals must select the location each box appeared at. If the participant answers correctly, the next trial will have one additional object.  | illustrations of objects | 0 | 2000ms | Random string of up to 16 unique objects presented at a random location of a 4x4 grid | immediate | 3 consecutive incorrect answers | total correct trials | median RT* |
| D | Verbal Reasoning | On the left-hand side, participants will be shown some geometric shapes (i.e., circle and square) combined in different ways. They will have to say whether the statement describing the two shapes is true or false. This is a variant of the 3-minute test of intelligence originally developed by Alan Baddeley (7).   | Geometric shapes of different colours | 0 | User response | - | immediate | End of stimuli (human dependent) | total correct trials | - |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D/Final Battery | 2D manipulations | Participants must identify a target array of objects in a choice of different arrays. The target will have been rotated through either 90, 180 or 270 degrees.  | grids with various patterns | 0 | User response | - | immediate | 3-minute timer | total correct trials | median RT for correct trials* |
| D | Balloons | This task is measuring mathematical abilities. Participant must solve additions, subtractions, multiplications, and divisions on balloons that appear on the screen.  | balloons containing mathematical equations | - | User response OR 10000ms | 40 balloons (10 additions, 10 subtractions, 10 divisions, 10 multiplications randomly distributed). | A new balloon appears every time a previous one is popped. If the participant gets 5 correct in a row, then an extra balloon is released | End of stimuli (task and human dependent) | total correct | median RT for additions |
| D/Final Battery | Tower of London (TOL) | TOL is a problem-solving task measuring executive functions, particularly planning abilities (8). Participants are given one starting board with coloured pegs (top) and are asked to mentally plan a sequence of moves to reorder the pegs so that they match a target disposition (bottom). In our computerised variant, subjects are required to indicate the number of moves needed to reach the final outcome.  | rings and pegs | 0 | User response | Random selection from predetermined problems of exact stimuli | immediate | End of stimuli (human dependent) | total correct trials | median RT for correct trials, median RT* |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D | Stop Change Task (SCT) | This task is an extension of the Stop Signal Task (9) and it involves the adaptation of the response rather than its complete inhibition. Participants must respond to left/right cues, while correcting their response if the target changes.   | arrows | uniform distribution (800 - 1000ms) | User response OR mean of previous user responses + 2 standard deviations | Random sequence of left and right. 25% of them are change trials | uniform distribution (800 - 1000ms) | End of stimuli (task and human dependent) | median correct RT | total correct corrections |

* = scores which started being recorded from stage 3 of the study

**Supplementary table 2**. Number of patients and controls having completed each individual test.

| Task | Total | Patients | Controls |
|---|---|---|---|
| Balloons - median RT for sums | 80 | 29 | 51 |
| Balloons - total correct | 80 | 29 | 51 |
| Blocks - median RT for correct | 82 | 35 | 47 |
| Blocks - total correct | 82 | 35 | 47 |
| Card pairs - % correct | 86 | 37 | 49 |
| Card pairs - duration | 86 | 37 | 49 |
| CRT - mean RT | 183 | 106 | 77 |
| CRT – standard deviation | 183 | 106 | 77 |
| CRT - total incorrect | 115 | 56 | 59 |
| Digit span - total correct | 81 | 34 | 47 |
| Mallas memory - foil errors | 177 | 104 | 73 |
| Mallas memory - total correct | 179 | 104 | 75 |
| Manipulations - total correct | 82 | 31 | 51 |
| Motor control - accuracy | 183 | 106 | 77 |
| Motor control - mean RT | 183 | 106 | 77 |
| Number location pairs- total correct | 78 | 32 | 46 |
| Object span - total correct | 82 | 36 | 46 |
| Odd One Out - median RT for correct | 79 | 32 | 47 |
| Odd One Out - total correct | 79 | 32 | 47 |
| PAL - total correct | 183 | 109 | 74 |
| Picture completion - duration | 89 | 39 | 50 |
| Picture completion - tot errors | 89 | 39 | 50 |
| Reverse digit span - total correct | 76 | 29 | 47 |
| SCT - median RT for correct | 86 | 33 | 53 |
| SCT - total correct corrections | 59 | 27 | 32 |
| Selective attention - incongruent RT cost | 83 | 35 | 48 |
| Spatial span - total correct | 85 | 36 | 49 |
| SRT - median RT | 122 | 56 | 66 |
| Stroop - incongruent cost | 80 | 36 | 44 |
| Stroop - incongruent cost RT | 80 | 36 | 44 |
| Stroop - switch cost | 80 | 36 | 44 |
| Stroop - switch cost RT | 80 | 36 | 44 |
| Target detection - median RT for correct | 180 | 105 | 75 |
| Target detection - total correct | 180 | 105 | 75 |
| TOL - median RT for correct | 81 | 32 | 49 |
| TOL - total correct | 81 | 32 | 49 |
| Trail making - part B mean RT | 186 | 110 | 76 |
| Trail making - switching cost | 186 | 110 | 76 |
| Verbal reasoning - total correct | 81 | 30 | 51 |

CRT=Choice Reaction Time, PAL=Paired Associate Learning, SCT=Stop Change Task, SRT=Simple Reaction Time, TOL=Tower of London. Note: CRT - total incorrect, Mallas memory- total correct, Stop change task - total correct corrections were started being recorded later on during the data collection stage.

**Supplementary table 3.** Demographic characteristics of the cohort of participants analysed in Stage 1.

| Demographics | Patients | Controls |
|---|---|---|
| Mean age (STD) | 43·16 (12·99) | 34.60 (13·45) |
| Gender (male:female) | 91:35 | 32:52 |
| Handedness (right:left:unknown) | 77:11:38 | 70:8:6 |
| First language (English:other:unknown) | 87:18:21 | 62:15:7 |
| Education (Secondary:University:unknown) | 2:38:61:25 | 16:62:6 |

Note: in some instances, participants declined to provide an answer for some demographic questions, and these were recorded as 'unknown'.

**Supplementary Table 4**. F and p values for the main effect of group and device derived from the general linear models conducted in Stage 1 of the analysis.

| Task | Device (F) | p | Group (F) | p |
|---|---|---|---|---|
| Balloons - median RT for sums | 0.32 | 0.81 | 0.29 | 0.59 |
| Balloons - total correct | 1.59 | 0.20 | 8.56 | 0.00 |
| Blocks - median RT for correct | 3.08 | 0.03 | 2.12 | 0.15 |
| Blocks - total correct | 0.16 | 0.92 | 1.06 | 0.31 |
| **Card pairs - % correct*** | 0.22 | 0.88 | 8.52 | 0.00 |
| **Card pairs – duration*** | 0.55 | 0.65 | 21.84 | 0.00 |
| **CRT - mean RT*** | 0.99 | 0.40 | 15.91 | 0.00 |
| CRT – standard deviation | 0.69 | 0.56 | 1.81 | 0.18 |
| CRT - total incorrect | 7.50 | 0.00 | 22.51 | 0.00 |
| Digit span - total correct | 0.79 | 0.50 | 1.07 | 0.31 |
| Mallas memory - foil errors | 0.39 | 0.76 | 3.82 | 0.05 |
| Mallas memory - total correct | 0.36 | 0.79 | 0.90 | 0.34 |
| **Manipulations - total correct*** | 0.05 | 0.98 | 11.00 | 0.00 |
| Motor control - accuracy | 7.61 | 0.00 | 16.65 | 0.00 |
| Motor control - mean RT | 3.66 | 0.01 | 9.05 | 0.00 |
| Number location pairs- total correct | 0.24 | 0.87 | 3.32 | 0.07 |
| Object span - total correct | 1.37 | 0.26 | 3.93 | 0.05 |
| Odd One Out - median RT for correct | 1.42 | 0.24 | 7.57 | 0.01 |
| Odd One Out - total correct | 1.56 | 0.21 | 0.55 | 0.46 |
| **PAL - total correct*** | 0.42 | 0.74 | 15.13 | 0.00 |
| Picture completion - duration | 1.98 | 0.12 | 0.28 | 0.60 |
| **Picture completion - tot errors*** | 0.53 | 0.66 | 4.97 | 0.03 |
| Reverse digit span - total correct | 1.52 | 0.22 | 2.95 | 0.09 |
| SCT - median RT for correct | 7.35 | 0.00 | 1.41 | 0.24 |
| SCT - total correct corrections | 2.14 | 0.11 | 0.19 | 0.66 |
| Selective attention - incongruent RT cost | 2.81 | 0.05 | 1.15 | 0.29 |
| Spatial span - total correct | 1.67 | 0.18 | 15.50 | 0.00 |
| SRT - median RT | 4.84 | 0.00 | 6.98 | 0.01 |
| Stroop - incongruent cost | 0.64 | 0.59 | 1.64 | 0.20 |
| Stroop - incongruent cost RT | 0.69 | 0.56 | 0.77 | 0.38 |
| Stroop - switch cost | 1.14 | 0.34 | 1.04 | 0.31 |
| Stroop - switch cost RT | 0.59 | 0.62 | 0.11 | 0.74 |
| Target detection - median RT for correct | 1.61 | 0.19 | 4.37 | 0.04 |
| Target detection - total correct | 0.12 | 0.95 | 0.97 | 0.33 |
| **TOL - median RT for correct*** | 1.04 | 0.38 | 6.99 | 0.01 |
| TOL - total correct | 1.08 | 0.36 | 1.03 | 0.31 |
| **Trail making - part B mean RT*** | 0.19 | 0.91 | 17.81 | 0.00 |
| **Trail making - switching cost*** | 0.67 | 0.57 | 9.60 | 0.00 |
| Verbal reasoning - total correct | 3.75 | 0.01 | 1.26 | 0.27 |

CRT=Choice Reaction Time, RT=Reaction Time, SCT = Stop Change Task, SRT = Simple Reaction Time, TOL=Tower of London. * = tasks that were selected and included in Stage 2 of the analysis.

**Supplementary table 5.** Demographic characteristics of the cohort of participants analysed in Stage 2.

| Demographics | Patients |
|---|---|
| Mean age (STD) | 45.23 (14.12) |
| Gender (male:female) | 39:9 |
| Handedness (right:left:ambidextrous) | 41:6:1 |
| First language (English:other) | 40:8 |
| Education (Primary:Secondary:University) | 1:19:28 |

**Supplementary table 6.** Demographic characteristics of the cohort of participants analysed in Stage 3.

| Demographics | Patients |
|---|---|
| Mean age (STD) | 42.60 (16.41) |
| Gender (male:female) | 39:11 |
| Handedness (right:left:ambidextrous) | 49:1 |
| First language (English:other) | 39:11 |
| Education (Primary:Secondary:University) | 2:19:29 |

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