Brief Descriptions of the 12 Cambridge Brain Sciences Tasks
## www.cambridgebrainsciences.com
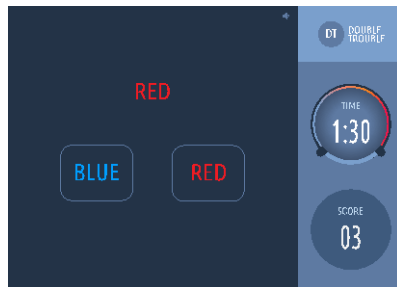
Double Trouble (Colour-Word Remapping Task)

A variant on the Stroop test (Stroop, 1935). Three coloured words are displayed on the screen: one at the top and two at the bottom. Participants must indicate which of two coloured words at the bottom of the screen correctly describes the colour that the word at the top of the screen is written in. The colour word mappings may be congruent, incongruent, or doubly incongruent, depending on whether or not the colour of the top word matches the colour that it is written in. Participants have 90 seconds to solve as many problems as possible.
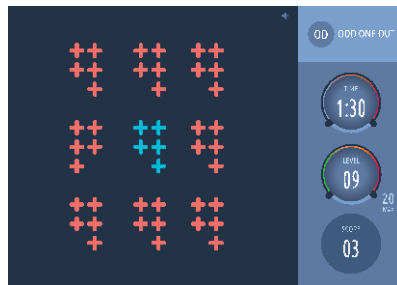
Odd One Out

Based on a sub-set of problems from the Cattell Culture Fair Intelligence Test (Cattell, 1949). Nine patterns will appear on the screen. The features that make up the patterns are colour, shape, and number and are related to each other according to a set of rules. Participants must deduce the rules that relate the object features and select the pattern that do not correspond to those rules. Difficulty is increased or decreased depending on whether the participant got the previous trial correct. Participants have 3 minutes to solve as many problems as possible.
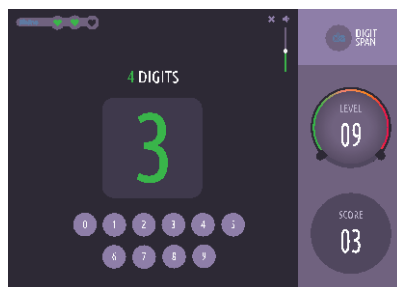
Digit Span Task

A variant on the verbal working memory component of the WAIS-R intelligent test (Weschler, 1981). A sequence of numbers will appear on the screen one after another. Once the sequence is complete, participants must repeat the sequence by entering them on the keyboard. Difficulty is increased or decreased by one number depending on whether the participant got the previous trial correct. After three errors, the task will end.

Feature Match Task

Based on the classical feature search tasks that have been used to measure attentional processing (Treisman & Gelade, 1980). Two grids are displayed on the screen, each containing an array of abstract shapes. In half of the trials the grids differ by just one shape. Participants must indicate whether or not the grid's contents are identical. Difficulty is increased or decreased by one shape depending on whether the participant got the previous trial correct. Participants have 90 seconds to solve as many problems as possible.
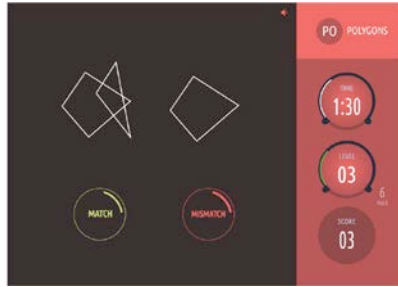
Polygons Task

Based on the Interlocking Pentagons Task, which is often used in the assessment of age related disorders (Folstein et al., 1975). A pair of overlapping polygons is displayed on one side of the screen. Participants must indicate whether a polygon displayed on the other side of the screen is identical to one of the interlocking polygons. Difficulty is increased by making the differences between the polygons more subtle or decreased by making the differences between the polygons more pronounced. Participants have 90 seconds to solve as many problems as possible.
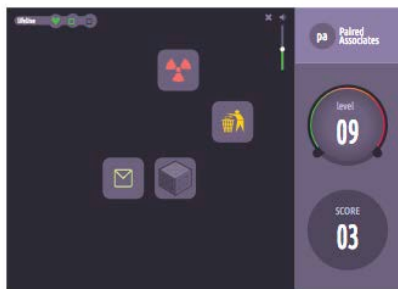
Paired Associates Task

A variant on a paradigm that is commonly used to assess memory impairments in aging clinical populations (Gould et al., 2005). Boxes are displayed at random locations on the screen. The boxes are opened one after another to reveal an enclosed object. Subsequently, the objects are displayed in random order in the centre of the screen and participants must determine which box contains the object that is presented. Difficulty is increased or decreased by one box depending on whether the participant got the previous trial correct. After three errors, the task will end.
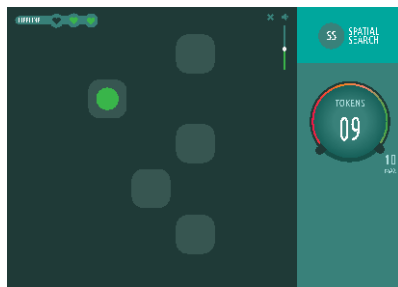
Token Search Task

Based on a test that is used to measure strategy during search behaviours (Collins et al., 1998). Sets of boxes are displayed on the screen in random locations. Participants must find a hidden "token" by clicking on the boxes one at a time to reveal their contents. When the token is found, it is hidden within another box. On any given trial, the token will not appear within the same box twice, thus, participants must search the boxes until the token has been found once within each box. If they search the same empty box twice whilst looking for the token, or search a box in which the token has previously been found, this is an error and the trial ends. Difficulty is increased or decreased by one box depending on whether the participant got the previous trial correct. After three errors, the task will end.
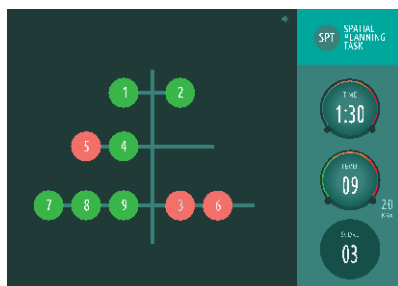
Spatial Planning Task

A variant on the Tower of London Task (Shallice, 1982), which is used to measure executive function. Numbered beads are positioned on a tree shaped frame. Participants must repositions the beads so that they are configured in ascending numerical order running from left to right and top to bottom of the tree, in as few moves as possible. Problems become progressively harder with the total number of moves required and the planning complexity increasing in steps. Trials are aborted if the participant makes more than twice the number of moves

required to solve the problem. Participants have 3 minutes to solve as many problems as possible.

Rotations Task

Often used for measuring the ability to manipulate objects spatially in mind (Silverman et al., 2000). Two grids of coloured squared are displayed to either side of the screen with one of the grids rotated by a multiple of 90 degrees. When rotated, the grids are either identical or differ by the position of just one square. Participants must indicate whether or not the grids are identical. Participants have 90 seconds to solve as many problems as possible.
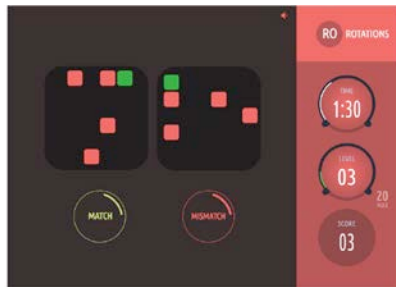
Spatial Span Task

A variant on the Corsi Block Tapping Task (Corsi, 1972), used for measuring spatial short-term memory capacity. 16 squares are displayed in a 4 x 4 grid. A sub-set of the squares will flash in a random sequence at a rate of 1 flash every 900 ms. Subsequently, participants must repeat the sequence by clicking on the squares in the same order in which they flashed. Difficulty is increased or decreased by one box depending on whether the participant got the previous trial correct. After three errors, the task will end.
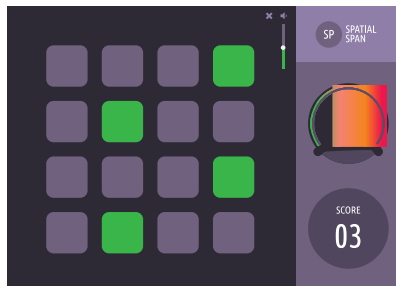
Grammatical Reasoning Task

Based on Alan Baddeley's three minute grammatical reasoning test (Baddeley, 1968). Short sentences describing the relationship of two shapes along with an image of the shapes are displayed on the screen. Participants must indicate whether the sentence correctly describes the pair of objects displayed on the screen. Participants have 90 seconds to solve as many problems as possible.
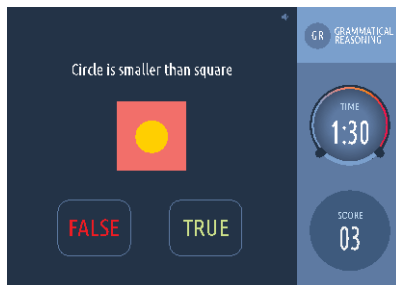
Monkey Ladder (Visuospatial Working Memory Task)

A variant on a task from the non-human primate literature (Inoue & Matsuzawa, 2007). Sets of numbered squares are displayed on the screen at random locations. After a variable interval of time, the numbers disappear leaving just the blank squares and participants must respond by clicking the squares in ascending numerical sequence. Difficulty is increased or decreased by one numbered box depending on whether the participant got the previous trial correct. After three errors, the task will end.