

Tests of Impulsive Decision Making

Product Vision

A portfolio of objective computerized assessments for measuring impulsive behavior and executive function which are sensitive to psychological state and treatment interventions.

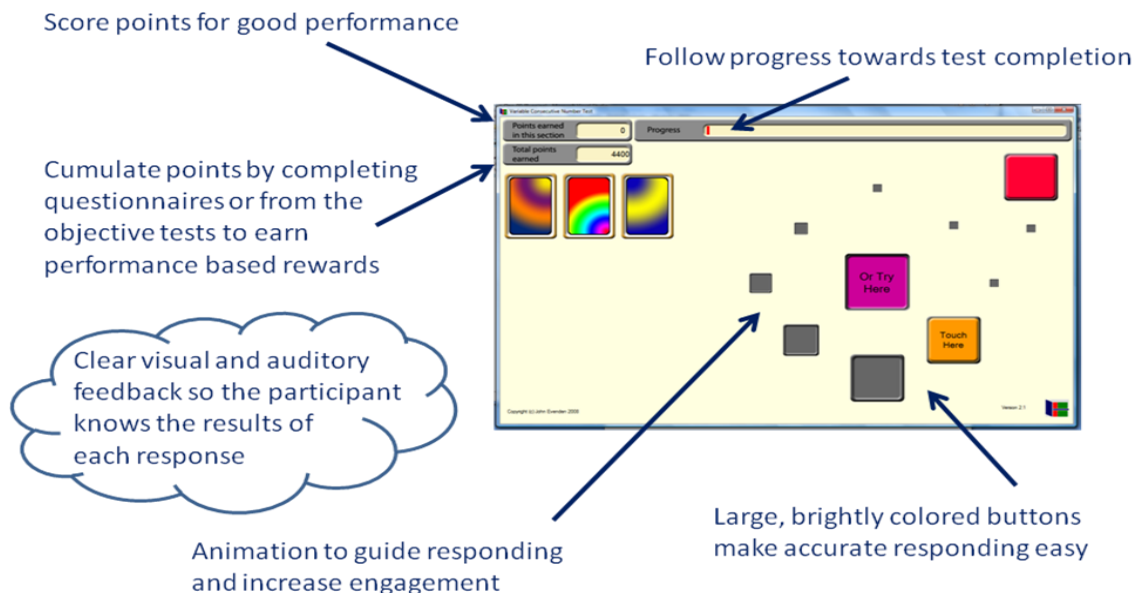
Product Characteristics

- No verbal test material, to maximize cross-cultural validity.¹
- Primary input via touch screen, for ease of use by participants unused to computers.²
- Short test times, to allow for assessment of a broad range of psychological constructs.
- Flexible selection of tests and questionnaires to construct the optimal test battery.
- Test administration by lay personnel using simple, instruction scripts and test examples
- Whenever possible, use translational procedures to facilitate application of preclinical findings from animal studies to human behavior.
- Questionnaire administration using visual analog or multi-choice Likert scales integrated into test battery

Product Highlights

General Principals

WiltonLogic has adopted some of the principals of game design in the construction of the psychological tests. Some of the key features are illustrated here:

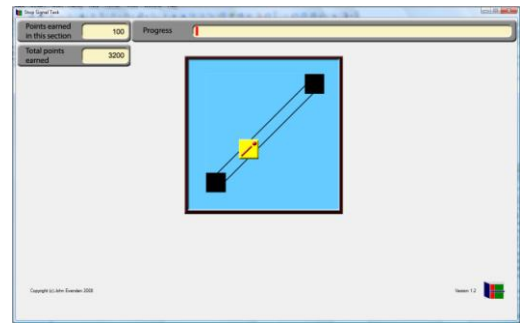


Impulsive Behavior

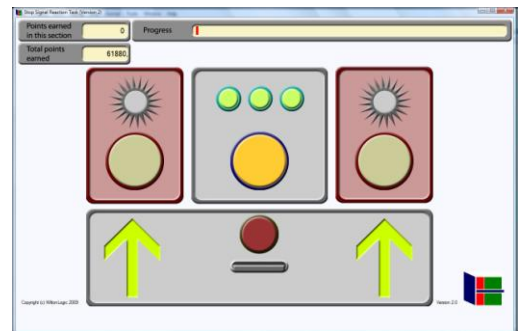
Stop-Signal Task

The Stop-Signal task is a method for testing inhibitory control mechanisms. The basic task structure is that the participant is requested to respond as quickly as possible to a signal. However, on a minority of occasions another event occurs, the “stop signal” which means that the participant should now withhold or redirect the response. WiltonLogic has developed two versions of the Stop-Signal task which differ slightly from standard versions.

The first of these is a single choice Go/No Go stop signal task. The participant is shown a yellow ball which moves across a space. The basic task is to touch the ball before it reaches its destination (here shown moving across the target area). However, on a minority of trials, there is an auditory signal, a whistle blowing, which tells the participant that they should withhold the response. The time between the start of the trial and the whistle can be varied. In general, the longer the delay, the more difficult it is to inhibit the response, and this difficult in inhibition is particularly pronounced in individuals with impulse control disorders.

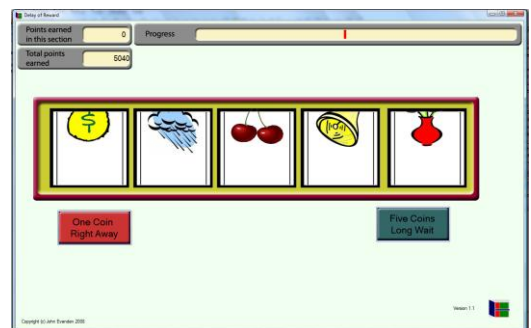


The second version of the stop signal task is a multi-choice task. The basic design is similar, in that the participant must touch the central target as soon as possible after the start of the trial. However, in the multi-choice task, the target can switch to either the left or right of the display at some time after the trial start, indicated by lighting up the greyed-out displays in the picture. If the target switches, the participant should switch response to the appropriate target. Multi-choice, or Switch-Signal tasks have been used more rarely in experimental studies, and combining this procedure with the single-choice Stop-Signal task offers the possibility to obtain more detailed information about the response inhibition profile of the test participant.



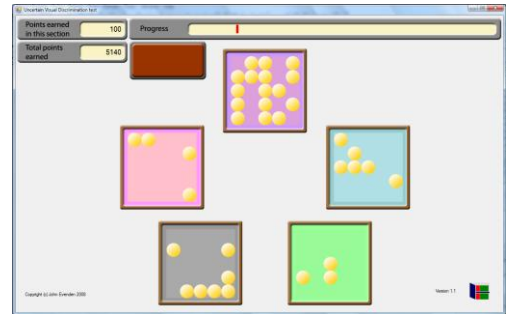
Delay of Reward Procedure (DOR)

WiltonLogic's delay of reward task uses real delays and points rewards based on choosing to wait for one or five coins to appear in the display. The participants are shown four response buttons, each associated with a reward size and a delay, one coin right away, or five coins right away, or after a short or a long delay. Once they have experienced the outcome of choosing each option, they are presented with a sequence of pairs of buttons. In the picture this is between one reward delivered almost immediately, and signaled by a single coin appearing in one of the five windows, or five coins, which only appear after a long wait (approx 40 seconds). The various options are presented in an intermingled fashion, to ensure all the programmed comparisons appear.



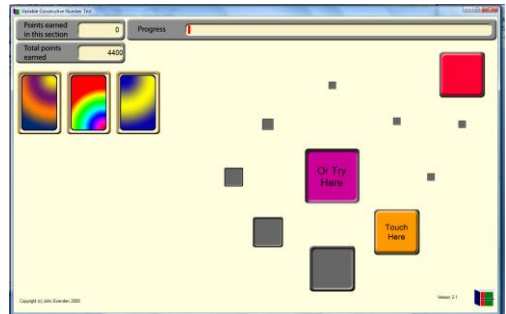
Uncertain Visual Discrimination (UVD)

The Uncertain Visual Discrimination test is designed to assess “reaction impulsivity”, the tendency to act before having all the necessary information. The participants are shown three targets, each of which contain a varying number of yellow balls. The number and location of these balls varies continuously. However, as time progress, the number of balls in one of the locations becomes consistently greater than those in the other locations (the purple box in the picture). The participants’ task is to choose which box this is. Quick responses will result in a less accurate choice, than waiting until the correct location is evident.



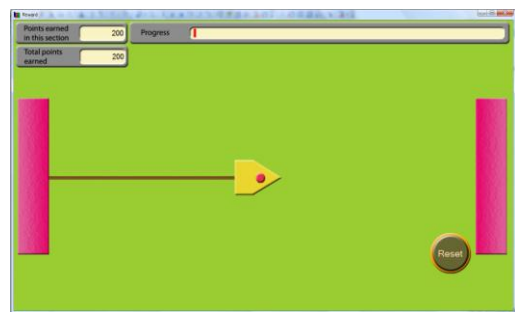
Variable Consecutive Number Test (VCN)

The variable consecutive number test assesses the propensity of a test participant to perform a series of acts to earn reward. In the test the participant touches locations in the outer ring of squares, progressing in a clockwise direction. At a time of their choosing, the participants should switch behavior and touch the central, pink location to open the three rainbow colored reward boxes. Up to a limit, the likelihood of all three boxes containing reward, and being considered a correct trial, increases the longer the participants keep stepping around the ring.



Persistence Test

The final aspect of impulsivity assessed by the battery is persistence. Highly impulsive people would be expected to show low persistence, whereas low impulsives would show high persistence. To measure this, WiltonLogic has developed a version progressive ratio procedure often used with non-human test subjects. In this procedure, the participant must touch the yellow target to move it across the screen. With 12 touches it reaches the right-hand side and a reward is earned. However, as each reward is earned, the number of touches required increases. This is achieved by the yellow target suddenly returning to the start position before 12 successive responses have been completed. The number of turns and the distance across the screen before returning are adjusted in a linear manner. The participant has one opportunity to reset ratio, and can then opt to end the test. The ratio reached before resetting and opting to end give a measure of persistence.



Risk Taking

Block Stacking Task

The block stacking task measures risk taking, since the behavior involves balancing risk against loss. In this task, the participant can build a stack of blocks. These blocks can be cashed in for points, but pressing the “Collect” button. However, as can be seen from the picture, the stack is uneven and can suddenly collapse. The likelihood that the stack collapses rises, the higher it gets. If the stack collapses the blocks cannot be cashed in, and the opportunity to earn points is lost. Risk-averse participants will cash in the stack while it is still low, whereas risk taking subjects will stack up more blocks, and lose them more often.



Data Storage

Data are appended to an ASCII file labeled with the participant identifier on completion of each test. These files can easily be clipped and pasted into data analysis programs. During 2009 WiltonLogic plans to include an encryption algorithm, allowing data to be stored as encrypted binary strings to maintain confidentiality and hinder interference with the data records.

Recommended Equipment

WiltonLogic recommends the use of HP tablet computers, current model Jan 2009, HP TouchSmart tx2z series. These computers have a touch screen, and a convertible design with a twisting hinge that lets the screen to swivel to display mode so that the test participant does not have to reach across the keyboard.

Contact Information

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¹ Verbal instruction scripts are used, and a small number words for prompting or feedback which can be translated into the language of choice.

² Input via mouse is also possible, although test characteristics may vary slightly