**SUPPLEMENTARY METHODS**

**Tool for detection of blinks and saccades**

Paragraph 1 The software tool for artefact, blink and saccade detection was implemented using Matlab (Mathworks version 2010b) and was extensively tested using a large database of active eye fixation performed by healthy young adults (3). Essentially, this software is an implementation of an Artificial Neural Network (ANN) information processing system, which contains a large number of highly interconnected processing neurons. These neurons work together in a distributed matter to learn from the input information, to coordinate internal processing and to optimize its final output (1). In the current implementation, the ANNs classifiers comprises of a feed-forward neural network with one hidden layer and one output. After experimentations, the optimal number of neurons in the hidden layer was considered to be 10 and the number of epochs was equal to 1,000. The output layer consists of one neuron, encoding two classes corresponding to the various eye movements’ types: saccades and non-saccades (0= fixation and 1=non-fixation). In order to avoid overtraining and achieve an accepted generalization in the classification, three data sets have been selected: training set, validation set, and testing set. The ANN is trained using the training set and the training phase stops when the performance in the validation set is maximized. The classifier was trained 10 times with different training and test sets each time. The training sets comprised 60% of the available patterns which were selected randomly. 20% of the feature vectors were used for testing the neural network and the rest 20% for validation.

**Calculation of pooled d-prime 95% confidence interval.**

Paragraph 2 The following formula was used to compute the variance for each one of these pooled d-prime scores(2):

$$d-prime\_{var}=\frac{\left[P\left(h\right)\* \left(1-P\left(h\right)\right)\right]}{\left[\left(Nhits + Nmisses\right)\*\left(Φ\left(P\left(h\right)\right)\right)2\right]}+\frac{\left[P\left(fa\right)\* \left(1-P\left(fa\right)\right)\right]}{\left[\left(Nfalarms + Ncor.rejections\right)\*\left(Φ\left(P\left(fa\right)\right)\right)2\right]}$$

 (1)

In formula (1) the function Φ for each proportion of hits (P(h)) and false alarms (P(fa)) is given by the formula:

$$Φ\left(P\right)= \frac{1 }{\sqrt{2\*π}} \* \frac{e -1}{2}\*z\left(P\right)^{2} (2)$$

Using formula (4) the variance of the pooled d-prime was computed and then standard error of d-prime was derived by:

$$d-prime\_{se}= \sqrt{d}-prime\_{var} (3)$$

The 95% confidence intervals (CI) for the d-prime were derived by:

$$95\%CI = d-prime \pm 1.96\*\left(d-prime\_{se}\right) (4)$$

**REFERENCES**

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