

Attention visual field and driving ability



The ability to drive a vehicle is largely dependent upon the fast and reliable acquisition and analysis of a large number of visual information.

The purpose of the evaluation of the attention visual field is to detect alterations of visual attention that have been shown to be highly correlated with the frequency of road accidents. (BALL & al, 1988, BALL & al, 1993, GABAUDE, 2003, MOESSINGER, 2002).

The main application of this exam is the evaluation of driving ability:

- when a sensory deficit is present, to determine the ability of the subject to compensate the deficit,
- for an early screening of cognitive deficits that may result, for example, from brain infarction or Alzheimer disease (RUBIN & al, 1999).

Advantage of the attention visual field compared to the « classic » visual field

The “classic” visual field consists in the detection of a light contrast in the periphery.

It is essentially affected by sensory deficits and may miss deficits from cognitive origin.

On the other hand, some subjects with a “sensory” deficit are able to achieve “good” visual performance by developing compensation strategies using eye movements.



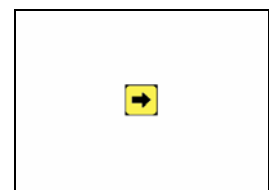
Compatible stimulators



Methodology

Simple attention

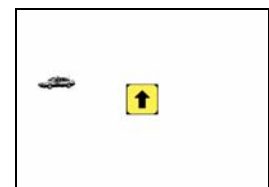
The subject indicates with a level the direction of an arrow appearing on the screen. Performance is evaluated from the percentage of correct responses and from the average response time.



Divided attention

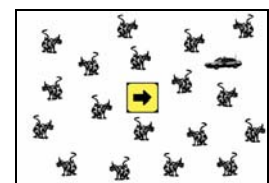
The second phase of the exam involves two simultaneous tasks :

- one central task, identical to the first phase,
- an additional task of peripheral detection of an object appearing at random in the peripheral visual field.



Selective attention

In the third phase, the peripheral task is made more difficult by the addition of visual distractors in the peripheral visual field.



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Quantitative analysis of results

The results of the examination three phases include:

For simple attention :

The number of correct responses compared to the number of presentations and the average response time.

For divided attention :

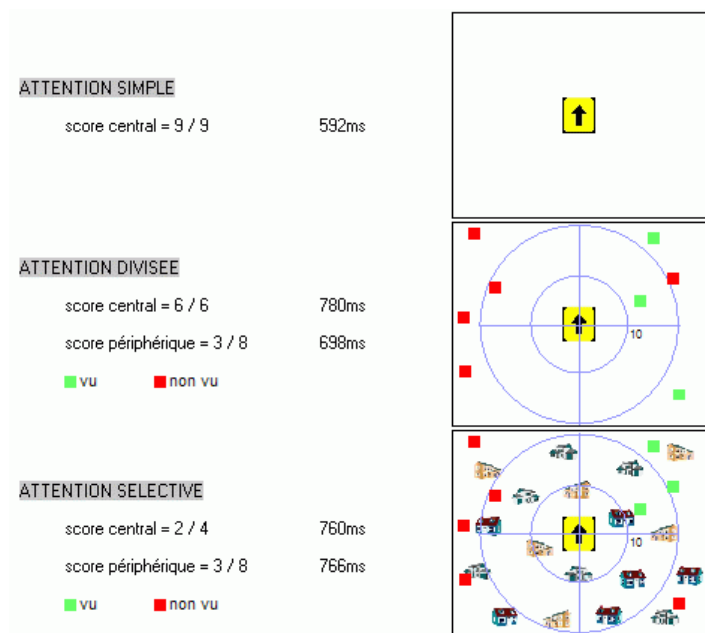
The number of correct responses compared to the number of presentations and the average response time for central and peripheral tasks.

Tests seen in the periphery are indicated in green and in red if not.

For the study of selective attention (with distractors) :

The number of correct responses compared to the number of presentations and the average response time for central and peripheral tasks.

As in the previous phase, the tests seen in the periphery are indicated in green and in red if not.



Example of attention visual field in a patient with a non compensated hemianopsia

Bibliography

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RUBIN G.S., KEYL P.M., MUNOZ B., ARVO, 1999.