

**PSYKOLOGFIRMA  
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## **Focus training with Mindball Trainer**

### **Background**

I have been engaged by Interactive Productline IP AB ("IP") to participate in the process of performing a study to test the hypothesis that you do become better at focusing if you train regularly on Mindball Trainer.

Mindball Trainer is tool for training your ability to focus. The technique is based on EEG; A methodology for measuring and graphically present the electricity of the brain. Mindball Trainer consists of a case with all functionality built in. On the surface of the case a ball is rolling back and forth depending on how you perform. A monitor presenting graphics and a headband with sensors for measuring the brain waves is connected to the case.

The study has been performed at two schools in Sweden; with students between 13 and 18 years old. In total 29 students (32 students started the study but 3 of them chose not to follow through). The students do not have any kind of neuropsychiatric diagnosis nor are they aware of having any kind of attention or focus difficulties.

The students trained once a day for 30 minutes on at least 20 occasions, without interruptions as far as possible with regards to school holidays.

The study is approved by the Central Ethical Review Board in Stockholm <https://etikprovningsmyndigheten.se/> (Scroll down for information in English) Registration no. 2011/1612-31/1.

The study is monitored by Karolinska Trial Alliance <http://www.karolinskatrialliance.se/en>. Contact persons Birgitta Strandberg and Katja Lundgren.

I have been responsible for administration and supervision of Conners' Continuous Performance Test II (CPT II) and as such I have performed and supervised the testing and evaluated the test results as well as transferred them to raw data charts.

### **Conners' Continuous Performance Test II**

A continuous performance test measures a persons' ability to sustained attention and selective attention. Sustained attention (vigilance) can be described as the ability to stay focused over time. Difficulties within this parameter are interpreted as an inability to control impulsivity. Selective attention shows the ability to stay focused momentarily and be able to spot differences. Difficulties with this parameter are interpreted as being easily distracted.

[http://en.wikipedia.org/wiki/Continuous\\_Performance\\_Task](http://en.wikipedia.org/wiki/Continuous_Performance_Task)

When performing Conners' CPT II you sit in front of a computer screen while different (capital) letters show up on the screen with different time intervals and at different tempos. The instruction is to press the space bar when a letter shows except for the letter X. The testing takes about 15 minutes.

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The result is presented as a T-score in comparison with a norm group. Reaction time, failure to press or failure not to press the space bar, is presented in a number of parameters. These parameters show attention, impulsivity, vigilance (sustained attention), response time and whether the result in general refers to a clinical or non-clinical group.

#### **The Measurement**

The students performed a CPT II test session before training period on Mindball Trainer and once again after the whole training period.

#### **The Parameters**

Attention is in itself an ability to see, to distinguish, to perceive phenomenon with some richness of details. Focus is the ability to keep your attention to something specific during a certain period of time. Impulsivity can be viewed as the inability to keep focus and attention (which in turn can have many underlying reasons). All factors interact and affect each other.

Some of the parameters in CPT II are considered among researchers to specifically show the ability to focus and keep a sustained attention. IP and I have agreed to measure the students' result with three of these parameters. These parameters measure the consistency of the reaction time over time, omission errors and commission errors:

HRT SE Hit (Reaction Time Standard Error). It gives a value of the consistency of reaction time through the whole test. A low value represents a good response speed consistency. The parameter describes the ability to stay focused over time.

Omission – A value of the number of errors made by not pressing the space bar for letters that are not X. It describes the ability to focus and to distinguish objects from one another.

Commission - A value of the number of errors made by pressing the space bar when the letter X is showing up. It describes the ability to focus and to distinguish objects from one another.

IP has also recorded the results measured with the software built in in Mindball Trainer. These values have been measured during the whole of every training session and are called Number of Units in the statistical report (see below).

#### **The Result**

The measurements show that you are most likely to become better at focusing after training on Mindball Trainer. Three out of four parameters give a statistically significant result under the supposition that you will see an increase of the ability to focus.

In order to get all four parameters statistically significant you probably need to continue the study with approx. 60 persons additionally.

The details of the result can be read in the report "Statistical analysis of differences", Document ID Mindball 2012:2, rev 2, [Statistical Analysis of Differences](https://www.statistikkonsulterna.se/?lang=en) produced by Statistikkonsulterna, <https://www.statistikkonsulterna.se/?lang=en>

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