EXPERIMENT 4: ***Prestimulus Oscillatory Activity in the Alpha Band Predicts Visual Discrimination Ability, Van Dijk et al., 2008***

**Introduction**

* The experiment was done by researchers in order to show that prestimulus oscillatory activity in the alpha band predicts visual discrimination activity.

**Objective**

* Study the mechanisms of how we perceive the world around us.
* Study when the subject was able to perceive different contrasts.

**Protocol**

* Perithreshold smaller disc superimposed to bigger discs of different contrast flashed always in the same location to be perceived 50% of the times during ***MEG recordings***
* Differently from EEG (used in experiments 1,2,3), ***MEG records the magnetic field produced by electrical activity in the brain.***
* Stimuli parameters identical across all trials for each participant.

**Method**

* the experiment was tested over *eight subjects* that, during *MEG* recordings, were undergone a *peri-threshold small disc superimposed to bigger discs of different contrast* flashed always in the same location to be perceived *50%* of the times
  + the *threshold stimulus* was presented *70%* of the times, while an *easy stimulus* *4%* of the times and a *no-contrast stimulus* the remaining *26%*
  + In 50% of the cases the first circle is perceived, the second circle is perceived in 100% of the cases due to the high contrast of the target, the last circle has no contrast and is never perceived.
  + oscillatory activity was recorded by MEG and calculated by means of *FFT*
* ***MEG analysis prior to stimulus presentation*** in order to find a ***relationship between pre-stimulus MEG activity and stimulus discrimination.***
* this study shows that:
  + from a topography of the difference in the alpha band between misses and hits averaged over subjects, ***stronger alpha power is significantly correlated to misses*** rather than to hits, namely that ***alpha power correlates with contrast-discrimination in a simple visual task*** in the sense that an increase in posterior alpha power correlated with a decrease in discrimination ability



* + there is no correlation between alpha power and *reaction time* in a discrimination task, indeed no significant difference emerged for *RT* when sorted according to alpha power quartiles

**Results**

* Alpha power correlates with ***contrast-discrimination*** in a simple visual task
* Subjects were much better in perceiving the stimulus when alpha was very low and viceversa; again, we are discovering and ***inverse correlation***.
* ***Increases in posterior alpha activity reflect active inhibition of posterior areas*** (posterior areas/posterior cortex is the sensory cortex).