34/04 - "fMRI and photo emission study of presentiment: The role of "coherence" in retrocausal processes"
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Abstract: The rationale behind this experiment is that presentiment is supposed to be explained as an example of time-symmetry in physics. In physics, time symmetry generally is not observed, but theoretical considerations suggest that the breaking of time-symmetry is due to the asymmetry in the availability of coherent multi particle transmitters, such as lasers, and coherent multi particle absorbers.
Time symmetry might therefore occur when the brain state is extremely coherent. Meditation is thought to be a practice resulting in such coherent brain states. Therefore our main hypothesis is that meditators show larger presentiment effects. Presentiment effects are measured by comparing the brain activity **before** emotional stimuli with the brain activity before neutral stimuli. Because these stimuli are presented randomly and the subject cannot know which type of stimulus will be presented there should be no difference.
In order to evaluate this hypothesis we cannot use a whole brain analysis but should focus on certain regions in order to reduce the otherwise required corrections for multiple analysis. The strategy we used was to establish which brain regions do behave differently in control subjects and meditators when stimuli are presented **irrespective of the type of stimulus**. So in assessing these brain regions for possible presentiment we do NOT select on the basis of later differential behaviour between emotional and neutral stimuli because such a selection would basically result in spurious results as the signals before and after the stimulus are correlated.
Eight experienced meditators were trained to meditate in the hostile environment of brain scanner. There they were presented with, in total, 64 random neutral, erotic and violent visual stimuli during meditation in the scanner. In a separate session they were presented similar stimuli during the resting state. The resting state measurements were also compared to data obtained from 8 control subjects.
First we analyzed the 'normal' i.e. causal effects of the stimuli on the brain activity as measured by Bold-levels in the brain.
In total we found 36 brain regions that showed significant contrast between the session when the meditators were meditating and when they were not meditating and comparing the control subjects in rest with the meditator in rest.
Substantial effects of meditation on brain processing of different emotional visual stimuli were found in several brain regions. The relatively largest direct effects of meditation concerned Brodmann areas 18 and 19 in the Lingual Gyrus. Long term effects of meditation, inferred from the contrast between meditators in rest with control-subjects in rest, were only found in brain regions that have been shown to be involved in attention.
For the evaluation of the hypothesis concerning presentiment we focused on the analysis of the anticipatory brain signals preceding neutral and emotional visual stimuli in the 36 regions of interest. In previous work with unselected subjects it was found that these anticipatory signals are dependent on the type of the future stimulus, in spite of the fact that at the time the signals are recorded the future stimulus is completely unknown and will be selected randomly. The semi-qualitative analyses of the current results show that indeed this presentiment effect could be replicated in the brain scanner with control subjects. Experienced meditators showed stronger presentiment especially when they were meditating. The effect of meditation was quite clearly that the 'retrocausal' effect of violent stimuli was reduced resulting in a relative larger contribution of erotic presentiment. However, stronger conclusions, also with respect to spatial distribution of the effect, can only be drawn after full quantitative evaluation, which currently is in process.

Keywords: coherent brain states, meditation, presentiment, emotion, fMRI