Effects of anxiety on visuospatial pattern discrimination and decision-making processes: what can we learn from brain dynamics?

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Detection and discrimination of visuospatial input involve at least the extraction, selection and encoding of relevant information and decision-making processes allowing selecting a response. These two operations are altered, respectively, by attentional mechanisms that change discrimination capacities, and by beliefs concerning the likelihood of uncertain events. Information processing is tuned by the attentional level that acts like a filter on perception, while decision-making processes are weighed by subjective probability of risk. In addition, it has been shown that anxiety could affect the detection of unexpected events through the modification of the level of arousal. Consequently, purpose of this study concerns whether and how decision-making and brain dynamics are affected by anxiety.

To investigate these questions, the performance of women with either a high (12) or a low (12) STAI-T (State-Trait Anxiety Inventory, Spielberger, 1983) was examined in a decision-making visuospatial task where subjects had to recognize a target visual pattern from non-target patterns. The target pattern was a schematic image of furniture arranged in such a way as to give the impression of a living room. Non-target patterns were created by either the compression or the dilatation of the distances between objects. Target and non-target patterns were always presented in the same configuration.

Preliminary behavioral results show no group difference in reaction time. In addition, visuo-spatial abilities were analyzed trough the signal detection theory for quantifying perceptual decisions in the presence of uncertainty (Green and Swets, 1966). This theory treats detection of a stimulus as a decision-making process determined by the nature of the stimulus and cognitive factors. Astonishingly, no difference in *d'* (corresponding to the distance between means of the distributions) and c (corresponding to the likelihood ratio) indexes was observed.

Comparison of Event-related potentials (ERP) reveals that brain dynamics differ according to anxiety. It shows differences in component latencies, particularly a delay in anxious subjects over posterior electrode sites. However, these differences are compensated during later components by shorter latencies in anxious subjects compared to non-anxious ones.

These inverted effects seem to indicate that the absence of difference in reaction time relies on a compensation of attentional level that tunes cortical activation in anxious subjects, but they have to work hard to maintain performance.