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**The Brain and Reality - from Placebo to Psychosis**

**Abstract text:**

Although the placebo phenomenon has fascinated humans for centuries, we are just beginning to understand some of its components. Well-structured behavioral studies, combined with functional imaging methods and ideas from cognitive theories, have recently greatly improved our understanding of the underlying mechanisms. The placebo process has been studied more in relation to pain (i.e. placebo analgesia) than any other sensation or experience. In placebo analgesia several regions are activated including the rostral anterior cingulate cortex (rACC) and lateral orbitofrontal cortex (lObfc) [1]. While the rACC has both been associated with an opioid network and attentional modulation of emotional processes, the lObfc is involved with higher cognitive functions in the emotional and homeostatic domain such as reappraisal and treatment expectations of emotional states. Apart from the effect on pain processing the placebo treatment seems also to be large in several other clinical states such depression and Parkinson’s disorder. We are postulating that the placebo effect is a general phenomenon [2, 3] where our belief system can change any experience in the human mind, and that a common brain mechanism is involved in all types of in placebo treatments. In this conceptual model expectations of the system are compared with the input (or estimated input) leading to the production of error signals. This general process is driving top-down modulatory systems that change how input is processed and thereby producing the placebo effect. We also suggest that the learning of expectations is directly strengthened by the dopamine system. Our model of placebo is related both to how we experience subjective reality and to processes involved in psychosis.