Stroop test and hypnosis: the perceptual and the semantic suggestions increase the response accuracy through specific neurocognitive mechanisms

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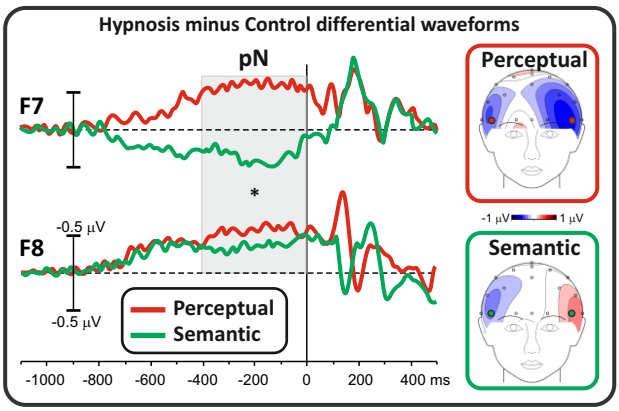
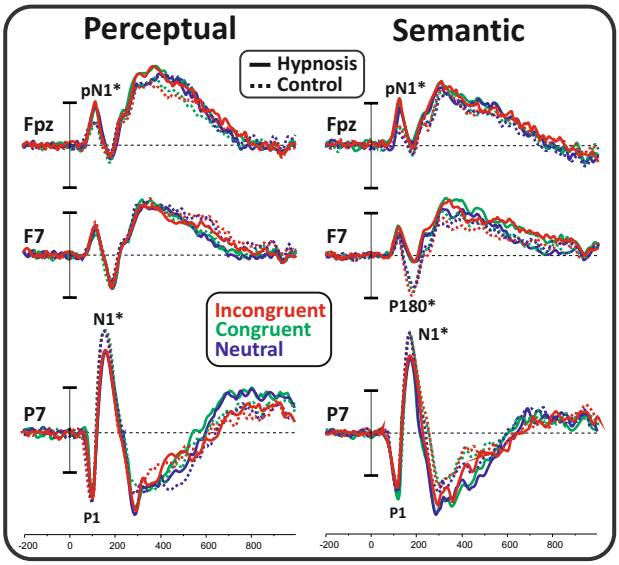
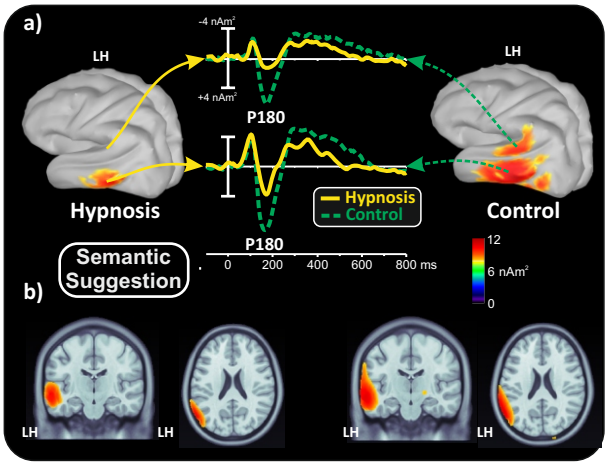
Introduction: A compelling literature suggested the possibility of adopting hypnotic suggestions to override the Stroop interference effect. However, only a few works attempted to provide a neurophysiological explanation of the effects, and none tested the role of different hypnotic suggestions.

Methods: subjects participated in three experimental sessions: in the first one, the level of hypnotizability was assessed. In the second and third sessions, EEG activity was recorded while subjects performed the Stroop task in the baseline and hypnotic condition with perceptual suggestion (i.e., to focus only on the central letter of the words) and semantic suggestion (i.e., to see meaningless symbols).

Results: The two hypnotic suggestions significantly increased the response accuracy. Event-related potentials (ERP) analysis revealed common and specific effects for the two suggestions. Both of them increased the sensory awareness (the anterior pN1 component) and reduced the discriminative visual attention on the stimuli (the occipital N1 component) compared to the baseline condition. Moreover, the perceptual suggestion selectively engaged more executive control of the prefrontal cortex (the pre-stimulus pN component), while the semantic one selectively suppressed the P180 component whose neural source was identified in the left temporal cortex devoted to the graphemic analysis of the words.







Discussion: Present findings demonstrated that the perceptual and the semantic hypnotic suggestions reduced the Stroop errors, and that this effect is mediated by common and specific top-down modulation of different processes ranging from the expectancy stage to the pre-semantic processing of the words. Further, as we recruited participants with a medium level of hypnotizability, present findings might be considered as potentially representative of the majority of the population.

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