# A neuro-cognitive approach to free will in social interaction

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**Abstract:**
Decision-making is central to cognition and to make conscious decisions of "free will" is an essential part of being human. However, it is difficult to establish the degree of freedom for our decisions and actions, especially as we are embedded in a complex web of relationships and interactions with our environment. Indeed, there are doubts, based on theoretical and experimental arguments, that there is any free will at all, although these arguments can be critizised and alternative interpretations of the experiments can be given. In this presentation, we will scrutinize some of these experiments and their interpretations, and suggest alternatives, as well as use computer simulations to elucidate the apparent enigma of how conscious (free) will may have causal effects on the material world. We will investigate how different internal and external factors may influence our decisions, and how intentions may lead to conscious decisions and subsequently to voluntary action by an individual in a social context.

The social dimension could hypothetically imply many conditions of significance for human volition and action. Social interaction has established the meaning systems that make human communication possible, which are also necessary for the conceptualization of human intentions. The individual is not only confined by social meaning systems, but the individual is also imbedded in social relations where interaction and expectancy could be assumed to affect individual behavior. In this context, we will specifically explore the influence of the experiment leader on subjects in psychophysical experiments.

For this purpose, we have developed a neurocomputational model of human decision-making, where both cognitive and emotional aspects are considered, with an objective to explore the relation between intentionality, free will, and an individual's decisions under social influence. The model includes various parts of the brain, thought to be involved in decision making, including the amygdala, the orbitofrontal cortex, the lateral prefrontal cortex, and the anterior cingulate cortex, as well as the mesoscopic neurodynamics of these structures. Model simulations mimic EEG and fMRI recordings of the neural activity that could be involved in the decision making process, although experimental results are yet lacking.