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# IT'S GOOD TO BE A 'BIRD BRAIN': AN EXPLORATION OF SOCIAL AND COGNITIVE ABILITIES IN TWO AVIAN SPECIES

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For a long time, birds have been associated with simple, automatic, and instinctive behaviours and considered as lacking higher cognitive functions. In the past decade, comparative psychology contributed to dramatic advances in the study of the avian mind, to the point that birds often parallel primates (including humans) and other large-brained mammals. In this talk, I will report recent evidence of fine social and cognitive abilities in two bird species, the domestic chicken (*Gallus gallus*) and the Eurasian jay (*Garrulus glandarius*). Being a precocial species, domestic chicks must be able to interact autonomously with the environment immediately after hatching, allowing us to study the very early stages of cognition. Here I will focus on precocial social abilities, showing that baby chicks can evaluate the quality of affiliative responses, and develop a preference toward more positive individuals. These results resonate well with the human literature on the crucial role of social cognition in several psychological domains. In a second part of the talk, I will discuss how jays can reason about probable future outcomes and react to the violation of expectations, and how their performance is intertwined with social cognition and personality traits, similar to what had been shown in humans. Evidence from animals with very different brains force to reconsider supposedly unique aspects of human cognition as shared abilities among different species and taxa. The comparative approach allows to discuss the existence of analogous cognitive mechanism in distantly related and ecologically different species, helping to evaluate competing claims about their origin and functioning.

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## THE CAUSAL ROLE OF PREFRONTAL AREAS IN MORAL DECISIONS: A TRANSCRANIAL DIRECT CURRENT STIMULATION STUDY

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For the dual process theory of moral judgment, automatic emotional responses and cognitive control compete in driving moral decisions. If the emotional response prevails, the judgment tends to reject the utilitarian option. At neural levels, these two processes are implemented by emotional vs. cognitive brain areas, such as the ventromedial (vmPFC) and the right dorsolateral prefrontal cortex (r-dlPFC). In this transcranial direct current stimulation (tDCS) study, we aimed to dissociate the vmPFC and r-dlPFC contributions to moral judgment. We assessed changes in subjective experience (valence, arousal, moral acceptability) and performance (choice, response time-RT) on a moral dilemma task (N=48) after anodal, cathodal, or sham tDCS (between-subjects) targeting vmPFC and r-dlPFC in two sessions (within-subjects). Half dilemmas were Trolley-type (i.e., killing one is an unintended consequence of saving others), and half were Footbridge-type (i.e., killing one is an intended means to save others). Trolley-type dilemmas elicited more utilitarian choices, slower RT, and higher unpleasant-ness, arousal, and acceptability ratings. RTs were slower after anodic tDCS of vmPFC, and acceptability ratings to Trolley-type dilemmas were higher in cathodal tDCS. All in all, our finding indicate that increasing vmPFC excitability increases the emotional-cognitive conflict, cascading in RT slowing. Decreasing overall cortical excitability reduces the emotional-cognitive conflict, resulting in greater acceptability.