

Contributions of Corticostriatal and Corticocerebellar Loops to Language—from Speculation to Hypothesis

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The cerebral cortex has long been considered as the main seat of our higher cognition, including language. However, while the critical roles played by the phylogenetically older subcortical regions in linguistic processing are increasingly recognized, an integrative framework has remained lacking. Towards this end, the domain-general mechanisms of the corticostriatal and corticocerebellar loops may provide a lens as to how they are involved in linguistic processing. Specifically, the corticostriatal loops are postulated to incorporate the overall goal at hand and other emotional factors like motivation and reward during the selection of both action and thought. In contrast, corticocerebellar loops behave like a high-performance cluster that automatically keeps track of the fine details related to all possible scenarios through error-based learning. In this talk, I will discuss the possible operations of these corticostriatal and corticocerebellar loops during speech production and comprehension. Through these speculations, hypotheses regarding the functional specification of these loops in linguistic processing will be proposed.