

This study explores the potential of transcranial alternating current stimulation (tACS) to modulate neural oscillations and improve memory consolidation, particularly focusing on gamma oscillations in the temporal cortices. The use of tACS, a non-invasive brain stimulation technique, targets the synchronization and functional connectivity of cortical neurons, offering a novel approach to enhance memory processes. Additionally, devices such as Actiwatch and ULTEEMnite are used and their data is utilized to monitor participants' activity levels and sleep patterns, providing valuable insights into the correlation between neural activity and sleep-wake cycles. The study builds on previous findings suggesting that gamma oscillations play a crucial role in episodic memory formation and retrieval, with implications for cognitive enhancement in aging populations. Future directions include larger and more diverse participant samples, as well as longitudinal studies to assess the sustainability of cognitive improvements. Overall, this research contributes to advancing our understanding of memory processes and the potential applications of tACS in cognitive enhancement.