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Title: Electromagnetic Actuation System (EMAS): Haptic Guidance for Enhancing Motor Sequence Learning

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Abstract: In a world dominated by the forces of globalization, industrial competition, and technological advancement, the ability to learn quickly is crucial for success in many academic and professional environments. Consequently, methods for acceleration of learning are highly sought-after. We seek to assess the influence of an Electromagnetic Actuation System (EMAS) on motor sequence learning. EMAS is a human-machine integration that physically drives the body, while allowing participants to retain their volition. By eliminating the structural rigidity of exoskeleton systems and the undesired haptic sensory inputs from electrical stimuli, the EMAS is a functionally superior resource for examining the effect of haptic guidance on motor learning. Subjects' performance will be evaluated under two conditions: base (EMAS off for all trials) and experimental (EMAS alternating on-off during training trials). Performance will be assessed in terms of absolute timing offset, hit rate, and score; analysis of statistically significant differences in timing offset between conditions will be conducted using Python. If we observe significant differences, we will demonstrate that the EMAS is a valuable psychophysical instrument for expediting the motor learning process. Such findings will inform our understanding of how to optimize learning in various contexts, like musical performance, education, and even space travel.