

An advantage in motor learning and performance for adults with ADHD when trained with vibratory stimulation to the trunk

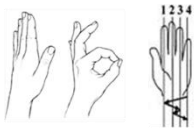
Maria Korman¹, Lian Meir-Yalon², Rinatia Maaravi-Hesseg², Avi Karni^{1,2}

¹ The Edmond J. Safra Brain Research Center for the Study of Learning Disabilities, University of Haifa,

² Laboratory for Human Brain and Learning, Sagol Dept. of Neurobiology, University of Haifa

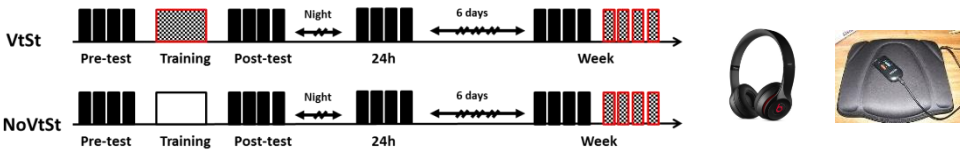
Background. Young adults with ADHD often gain less than expected from practice sessions well-suited for their peers. Here, we tested whether task-irrelevant, low-intensity vibratory stimulation (VtSt), suggested to modulate motor learning, may compensate for such learning deficits.

Methods. Participants were given training, either with or without VtSt, on a sequence of finger opposition movements. Motor performance was assessed before and immediately after training, overnight and at 1 week post-training.

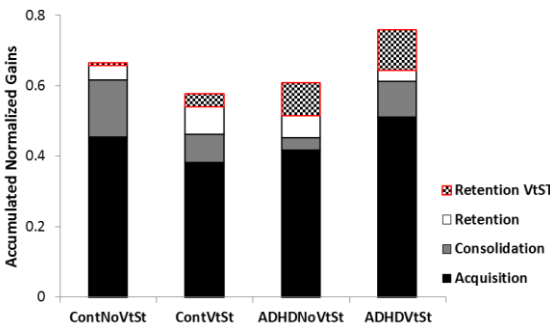


Trained Sequence: 4 1 3 2 4

Participants with and without ADHD were trained without (white box) or with background VtSt (red checkered box, main frequency ~65Hz, ~41dB).



Results. Under VtSt, controls had reduced overnight, consolidation phase, gains; performance partly recovering one week later. In contrast, participants with ADHD benefitted from VtSt both during the acquisition (online) and the overnight skill consolidation (offline) phases. One week later, both groups showed robust retention of the gains in performance, but when tested with background VtSt, individuals with ADHD outperformed their typical peers.



Following the training session, all groups improved by more than 50% relative to the pre-training baseline. After training with no VtSt, participants with ADHD showed an overall improvement of performance speed (by 51.6%) but the gains were, on average, smaller than those attained by their typical peers with no ADHD (65.8%). However, VtSt during training benefited subsequent performance in participants with ADHD (64.5%) but was relatively detrimental for typical controls (54.1%)

Conclusions. We propose that ADHD can confer advantages in performance, learning and skill memory consolidation in specific 'noisy' conditions that adversely affect typical adults; we conjecture that the effects of VtSt are contingent on baseline arousal levels