Society for the
Neural Control of Movement

3-F-23 Multi-Session Transcranial Direct Current Stimulation Concurrent with Discrete Sequence Production Task in Young and Older Adults

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The discrete sequence production (DSP) task is an explicit motor sequence learning task that can be used to measure chunking, or a grouping together of once discrete individual elements. The DSP task used here involves two, 6-item sequences presented at one time. Over many trials, participants learn the two, 6-item sequences and execute the sequences as 2 or more segments, or chunks. Right and left dorsolateral prefrontal cortex (DLPFC) have been demonstrated to be involved in early explicit sequence learning as well as early adaptation. Primary motor cortex (M1) has been shown to be involved in explicit sequence learning and retention. Further, pre-SMA has been shown to be involved in chunk loading in sequence learning. Here, we use transcranial direct current stimulation (tDCS), a non-invasive form of brain stimulation, in an effort to facilitate chunking in young and older adults in a modified version of the DSP task. Forty young (range 18-28 years) and 16 older (range 65-85 years), right-handed, adults completed a modified version of the DSP task while receiving anodal or sham tDCS to either right DLPFC, left DLPFC, M1, or pre-SMA over two sessions. Using a model developed by Acuna et al. (2014) to quantify chunking, preliminary results suggest that tDCS stimulation to pre-SMA facilitates at least one component of chunking in both young and older adults, whereas tDCS stimulation to m1 is more beneficial to only young adults. Specifically, the pause at the beginning of a chunk was significantly faster for young and older adults in the pre-SMA group relative to the sham group ($p = .037$) providing further support for the notion that this region plays a role in chunk loading. There were no significant differences between m1, right, and left DLPFC groups relative to sham.

Wednesday, April 27	**3-B-14**	Shared mechanisms in the estimation of self-generated actions and the prediction of other's actions	Tsuyoshi Ikegami[1], Gowrishankar Ganesh[1]	[1]National Institute of Information and Communications Technology (NICT)
Wednesday, April 27	**3-B-15**	A spike timing mechanism for respiratory motor control	Kyle Srivastava[1], Caroline Holmes[2], Michiel Vellema[3], Coen Elemans[3], Ilya Nemenman[2], Samuel Sober[2]	[1]Georgia Institute of Technology, [2]Emory University, [3]University of South Denmark
Wednesday, April 27	**3-B-16**	Neural substrates of priming of pop-out during eye and hand movements	J. Daniel McCarthy[1], Jeff Moher[2], Joo-Hyun Song[1]	[1]Brown University, [2]Williams College
Wednesday, April 27	**3-B-17**	Reaction time can be up to 100ms shorter if motor commands can be refined for accuracy demands after movement onset.	Jean-Jacques Orban de Xivry[1], Philippe Lefèvre[1]	[1]KU Leuven
Wednesday, April 27	**3-F-18**	Corticomuscular coherence reflects modulation of sensory feedback gain during motor adaptation	Shoko Kasuga[1], Natsumi Momose[1], Junichi Ushiyama[1], Junichi Ushiba[1]	[1]Keio University
Wednesday, April 27	**3-F-19**	Congruent visual motion cues speed dynamic motor adaptation	Sae Franklin[1], Yang Wang[1], Kevin Soon Hwee Teo[1], Vijay Maharajan[1], David Franklin[1]	[1]University of Cambridge
Wednesday, April 27	**3-F-20**	Examining the contribution of explicit knowledge to structural learning in a visuomotor adaptation task	Krista Bond[1], Jordan Taylor[1]	[1]Princeton University
Wednesday, April 27	**3-F-21**	Dissociating error-based and reinforcement-based learning.	Joshua Cashaback[1], Ayman Mohatarem[1], Heather McGregor[1], Paul Gribble[1]	[1]Western University
Wednesday, April 27	**3-F-22**	Bilateral interactions between choice learning and motor learning during human movement learning	Ganesh Gowrishankar[1], Naohiro Takemura[2], Tsuyoshi Ikegami[2]	[1]CNRS, [2]NICT, CINET
Wednesday, April 27	**3-F-23**	Multi-Session Transcranial Direct Current Stimulation Concurrent with Discrete Sequence Production Task in Young and Older Adults	Brian Greeley[1], Jonathan Barnhoorn[2], Willem Verwey[2], Rachael Seidler[1]	[1]University of Michigan, [2]University of Twente
Wednesday, April 27	**3-F-24**	Feedback delay modulates implicit and explicit visuomotor adaptation	Mathias Hegele[1], Raphael Schween[1]	[1]Giessen University
Wednesday, April 27	**3-F-25**	Can an artificial 'feel of North' change the perception of space? Evidence for vestibular recalibration via auditory sensorimotor contingencies signalling magnetic north using a novel device: the hearSpace app.	Frank Schumann[1], J. Kevin O'Regan[1]	[1]Université René Descartes, Paris 5
Wednesday, April 27	**3-F-26**	Distinct adaptation to abrupt and gradual torque perturbations with a multi-joint exoskeleton robot	Youngmin Oh[1], Giovanni Sutanto[2], Michael Mistry[3], Nicolas Schweighofer[2], Stefan Schaal[2]	[1]Neofect / University of Southern California, [2]University of Southern California, [3]University of Birmingham