



Neuroscience  
2015

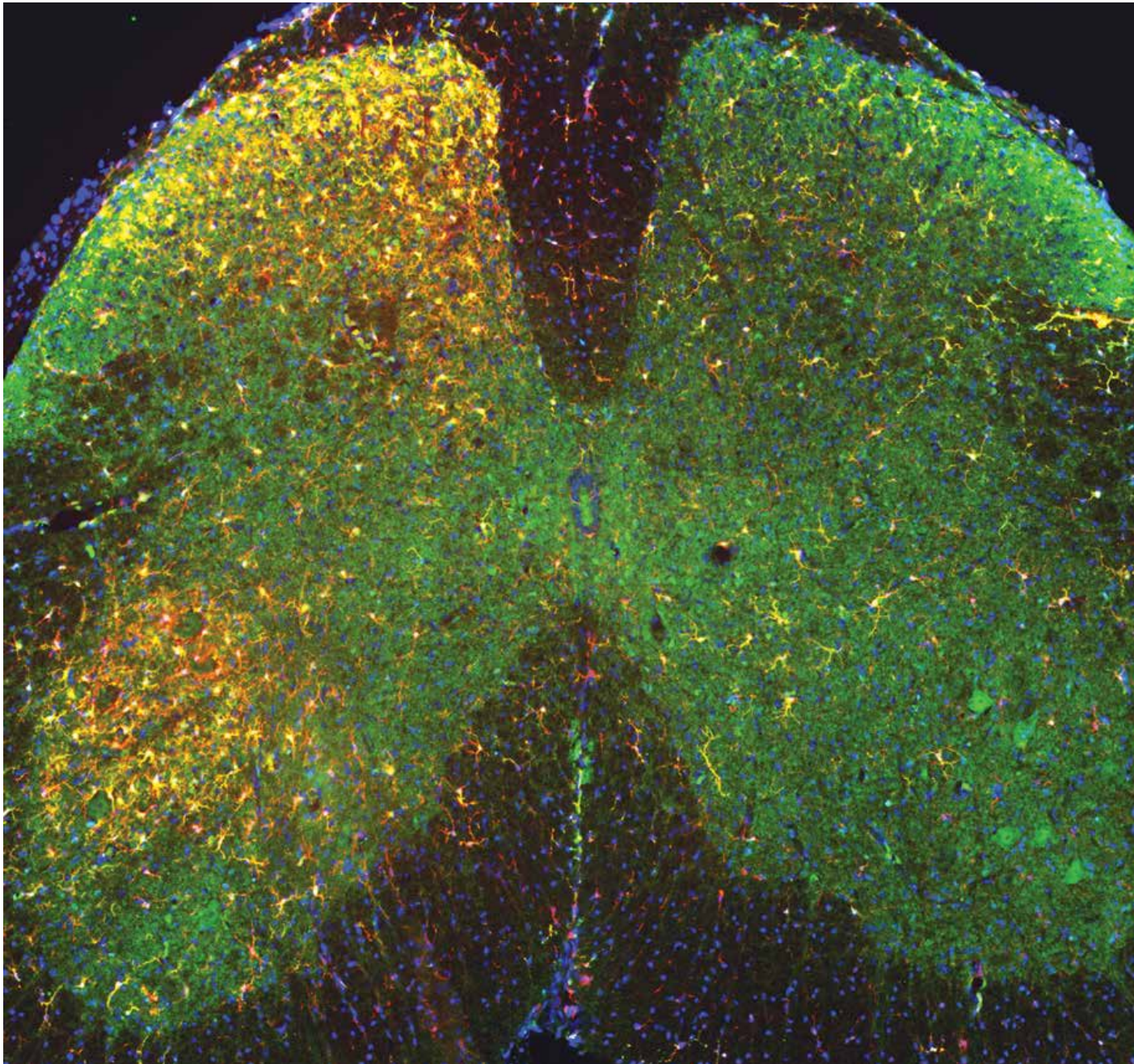
Chicago | October 17-21

# Friday to Saturday

Scientific Session Listings 1-95



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## Presentation Abstract

Program#/Poster#: 78.07/U40

Presentation Title: Age effects on the transfer of sequence knowledge between different types of movements

Location: Hall A

Presentation time: Saturday, Oct 17, 2015, 1:00 PM - 5:00 PM

Presenter at Poster: Sat, Oct. 17, 2015, 3:00 PM - 4:00 PM

Topic: ++F.01.c. Human learning: Motor and sequence learning

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**Abstract:** The goal of the current study was to determine whether age influences the ability to transfer sequential knowledge between two different types of motor responses. During practice of a discrete sequence production task, participants responded either by unimanual key presses (KP) on a standard computer keyboard, or by moving a lever with a flexion extension (FE) motion of their right arm. Sequence knowledge was then tested with the other type of responses. Stimulus presentation was identical over the whole task. Sequence learning theory suggests that performers first develop a cognitive representation and with additional practice a motor representation. Based on this insight and on previous research, we hypothesized that elderly would be able to transfer sequence knowledge between the two response modes. Because KP responses are less precise, we expected this condition to be more cognitively controlled than the more difficult FE condition, and therefore also hypothesized more transfer from practice using KP followed by a retention test using FE than vice versa. We tested 32 right-handed elderly (65 - 74) and 27 young people (18 - 30). Individual characteristics were described using the MOCA, a visuospatial working memory task, a digit symbol substitution task and a general health questionnaire. The experiment started with familiarization with KP and FE. Then, two 6-element sequences were practiced with KP or FE for a total of 288 trials. Participants were instructed that two fixed sequences were presented, but not that a test on transfer to another response mode would follow. After an explicit sequence knowledge questionnaire, the

test phase with the remaining type of movements followed. The test phase consisted of one block of 24 familiar trials and one block of 24 random trials. Transfer was defined as the percentage speed difference between the familiar and random test blocks. After FE practice, both age groups showed transfer of sequence knowledge. This effect was larger for young participants than for elderly. After KP practice, only young participants showed signs of transfer, which was smaller than the amount of transfer after FE practice. Because there was no difference in the amount of explicit sequence knowledge between the practice conditions, we conclude that there is either more implicit spatial sequence learning in the FE than in the KP response mode, or that KP responses are a more sensitive measure of implicit sequence knowledge. We found that elderly are indeed able to transfer sequence knowledge but to a lesser extent than younger people and that in both age groups response mode plays an important role in measuring such effects.

Disclosures: **J.S. Barnhoorn:** None. **F. Döhring:** None. **E.H.F. Van Asseldonk:** None. **W.B. Verwey:** None.

Keyword (s): LEARNING  
sequence learning  
transfer

Support: NWO ORA Plus

- 1:00 U29 **77.17** Fast-cyclic voltammetry reveals altered oxygen homeostasis in the nucleus tractus solitarius of the spontaneously hypertensive rat. P. S. HOSFORD\*; J. MILLAR; A. G. RAMAGE; A. V. GOURINE; N. MARINA. *Univ. College, London, QMUL Sch. of Med. and Dent.*
- 2:00 U30 **77.18** Changes in brain melanocortin system with calorie restriction-induced adaptive thermogenesis and suppressed physical activity. S. MUKHERJEE\*; S. L. BRITTON; L. G. KOCH; C. M. NOVAK. *Kent State Univ., Univ. of Michigan Med. Sch., Kent State Univ.*
- 3:00 U31 **77.19** ▲ Metabolic glucose, insulin and leptin circadian rhythms are altered by perinatal cafeteria diet in rats. D. J. BUSTAMANTE-VALDEZ; P. DURAN\*. *Facultad De Ciencias, UNAM.*
- 4:00 U32 **77.20** Brain glycogen fuels the exercising brain to maintain endurance capacity. T. MATSUI\*; H. OMURO; Y. LIU; T. SHIMA; M. SOYA; M. HAMASAKI; S. MIYAKAWA; H. SOYA. *Univ. of Tsukuba.*
- 1:00 U33 **77.21** Role of TRPV4 in prediabetic obese peripheral nerve. C. AVOUNDJIAN; B. COOPERMAN; L. R. BANNER\*. *California State Univ. Northridge.*

## POSTER

### 078. Motor and Sequence Learning

#### Theme F: Cognition and Behavior

Sat. 1:00 PM – McCormick Place, Hall A

- 1:00 U34 **78.01** Implicit motor learning in the absence of sensory-prediction errors. D. GRAEUPNER\*; P. A. BUTCHER; J. A. TAYLOR. *Princeton Univ., Princeton Univ.*
- 2:00 U35 **78.02** Modifying the discrete sequence production task for a multi day tdcx study in young and older adults. B. GREELEY\*; J. BARNHOORN; W. VERWEY; R. SEILDER. *Univ. of Michigan, Univ. of Michigan, Univ. of Twente, Univ. of Michigan, Univ. of Michigan.*
- 3:00 U36 **78.03** Fine motor control is associated with individual fitness level in older adults. C. VOELCKER-REHAGE\*; L. HUEBNER; B. GODDE. *Jacobs Univ. Bremen, Technische Univ. Chemnitz.*
- 4:00 U37 **78.04** Motor plasticity in assembly-line workers: Effects of repeated work task changes on manual dexterity and related brain function. B. GODDE\*; J. OLTMANN; C. VOELCKER-REHAGE; U. M. STAUDINGER. *Jacobs Univ., Columbia Aging Ctr.*
- 1:00 U38 **78.05** Task-related alpha power during a fine motor control task in young and older adults. L. HUEBNER\*; B. GODDE; C. VOELCKER-REHAGE. *Jacobs Univ. Bremen, Technische Univ. Chemnitz.*
- 2:00 U39 **78.06** A cognitive framework for explaining serial processing and sequence execution strategies. W. B. VERWEY\*; C. H. SHEA; D. L. WRIGHT. *Univ. of Twente, Texas A&M Univ.*
- 3:00 U40 **78.07** Age effects on the transfer of sequence knowledge between different types of movements. J. S. BARNHOORN\*; F. DÖHRING; E. H. F. VAN ASSELDONK; W. B. VERWEY. *Univ. of Twente, Saarland Univ.*
- 4:00 U41 **78.08** Age related differences in scheduling observational and physical practice. F. DÖHRING\*; S. PANZER. *Saarland Univ.*
- 1:00 U42 **78.09** Functional Connectivity patterns in the cerebellar-thalamic-cortical network predicts retention in locomotor adaptation. L. SHMUELOF\*; S. BAR-HAIM; F. MAWASE. *Ben-Gurion Univ. of the Negev, Ben-Gurion Univ. of the Negev, Ben-Gurion Univ. of the Negev, Johns Hopkins Univ.*
- 2:00 V1 **78.10** Error estimation training enhances motor learning in older adults. Y. CHEN\*; M. KWON; A. CASAMENTO MORAN; M. W. BEIENE; B. G. GRUBBS; F. T. FIOL; K. GAUGER; E. A. CHRISTOU. *Univ. of Florida.*
- 3:00 V2 **78.11** Rapid learning of higher-order statistics in implicit sequence learning. K. R. THOMPSON; P. J. REBER\*. *Northwestern Univ., Northwestern Univ.*
- 4:00 V3 **78.12** The influence of biomechanics and cognitive demands on locomotor sequence learning. G. BORIN; J. T. CHOI\*. *Univ. of Massachusetts Amherst.*
- 1:00 V4 **78.13** Transfer of sequence-specific and non-specific motor skills after constant and variable training. D. M. MUSSGENS\*; F. ULLÉN. *NINDS, Karolinska Institutet.*
- 2:00 V5 **78.14** Explicit knowledge in a motor sequence depends on strategy. M. JAYNES\*; M. SCHIEBER; J. MINK. *Univ. of Rochester Med. Ctr.*
- 3:00 V6 **78.15** Long-term stability of implicit sequential memory: One-year consolidation of probabilistic sequence learning. A. KÓBOR\*; K. JANACSEK; Á. TAKÁCS; D. NEMETH. *Res. Ctr. For Natural Sciences, HAS, Inst. of Cognitive Neurosci. and Psychology, Res. Ctr. for Natural Sciences, Hungarian Acad. of Sci., Inst. of Psychology, Eötvös Loránd Univ.*
- 4:00 V7 **78.16** Changes in NREM2 sleep spindle frequency play a causal role in motor sequence learning consolidation. S. LAVENTURE\*; S. FOGEL; G. ALBOUY; O. LUNGU; C. VIEN; P. SÉVIGNY-DUPONT; C. SAYOUR; J. CARRIER; H. BENALI; J. DOYON. *Univ. De Montreal, Univ. of Western Ontario, Katholieke Univ. Leuven, Univ. Pierre-et-Marie-Curie.*
- 1:00 V8 **78.17** Predicting individual differences in sequence learning from oscillatory activity in human MEG-data. F. ROUX\*; R. FROST; M. CARREIRAS. *Basque Ctr. On Cognition, Brain and Language, The Hebrew Univ. Jerusalem, BCBL. Basque Ctr. on Cognition, Brain and Language, BCBL. Basque Ctr. on Cognition, Brain and Language., Ikerbasque, Basque Fndn. for Sci., UPV/EHU, Univ. del Pais Vasco.*
- 2:00 V9 **78.18** The impact of predictability on implicit motor and perceptual sequence learning. L. KATZ; B. FLYNN; C. SINGH; C. SEMERJIAN; L. IZRAYLOV; M. MALABANAN; J. CUDIA; L. H. LU\*. *Roosevelt Univ.*