

**Title/ Behavioural repertoire influences the rate and nature of learning in climbing: Theoretical and practical implications**

**Author/** Dominic Orth<sup>1,2</sup>, Keith Davids<sup>3</sup>, Jia-Yi Chow<sup>4</sup>, Eric Brymer<sup>5</sup>, Ludovic Seifert<sup>6</sup>

**Affiliations/**1: Faculty of Behavioural and Movement Sciences, Vrije Universiteit, Amsterdam Movement Sciences, Amsterdam, The Netherlands; 2: Institute of brain and behaviour, Amsterdam, The Netherlands; 4: Centre for Sports Engineering Research, Sheffield Hallam University, UK; 5: National Institute of Education, Nanyang Technological University, Singapore; 6: CETAPS - EA 3832, Faculty of Sport Sciences, University of Rouen, France

In the ecological dynamics approach to perception and action, skill acquisition involves a process where the existing repertoire of behavioural capabilities of a learner are destabilized and re-organized through practice – this process can expand the individuals capabilities to explore new environments. In this study, the learning dynamics of body configuration patterns organized with respect to an indoor climbing surface were observed and behavioural capabilities evaluated prior to and after practice. Performance outcomes and movement patterns of eight beginners were observed across 42 trials of practice over a seven-week period. A pre-test and post-test procedure was used to determine the emergence of new movement patterns after the practice period. Data suggested the presence of different learning dynamics across individuals. The different learning dynamics included: continuous improvement, sudden improvement, and no improvement. Individuals showing sudden improvement appeared to develop a new movement pattern of coordination in terms of their capability to climb using new body-wall orientations, whereas those showing continuous improvement did not, they simply improved performance. The individual who did not improve in terms of movement stability, improved in terms of distance climbed. Individual differences can shape learning dynamics and may be evaluated prior to learning design.

**Keywords/** scanning procedure, intrinsic dynamics, rock climbing, motor learning, system degeneracy