

Previous work on the application of dynamical systems approaches to the study of human activity sought to reconcile Bernstein's (1967) concepts with the mathematics of dynamical systems (Kugler et al., 1980). An influential early research paradigm was developed by Haken, Kelso and Bunz (Kelso, 1981; Haken et al., 1985). In this work, participants performed a very simple task (alternate tapping of index fingers in time to a metronome) and it was demonstrated that, once the speed exceeds a certain threshold, the two fingers stop moving out of phase and move in phase. This shift is abrupt and indicates a change in attractor state of a dynamical system which is seeking to optimise specific order parameters (Beek et al., 1995).

In terms of using wearable sensors to study skill, Ahmadi et al. (2009), using marker-based motion-capture and inertial measurement units (accelerometer and gyroscope) on the person, showed that skill level corresponds to peak values in velocity for shoulder rotation, wrist flexion and upper arm internal rotation prior to a tennis serve. This suggests that the objective classification of skill can be made from data acquired from on-body sensors. Similarly, Baber et al. (submitted) have shown that it is possible to distinguish between skill levels for jewellery students performing simple tasks, using sensors embedded in their tools.

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