Benefits of observing point-light displays in learning a weightlifting movement for beginners

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Introduction

Individual can learn movements from observing others and it can complement physical practice (Larssen et al., 2021). Those beneficial effects of action's observation rely on the ability of human beings to recognize and interpret human movements and were highlighted by the point-light display paradigm (PLD, Johansson, 1973). Actually, the efficacy of PLD observation has been demonstrated for individual movements such as cricket bowling (Breslin et al., 2009), football (Horn et al., 2002) judo techniques (Francisco, 2022). In the present experiment, we tested the effect of video and PLD observation, combined with physical practice, in the acquisition of the cluster that required complex coordination.

Method

26 beginner undergraduate students were divided in 3 groups: the PLD group (n=10) observed PLD movements completed by an expert; the Video group (n=10) observed RGB video of the same movements completed by the same expert; the Control group (n=6) watched movie of the same duration without human movement. Participants completed a cluster with an unloaded bar (pre-test), an acquisition phase made of 12 observation and 12 physical practice trials of the cluster once a week during 5 consecutive weeks. One week later, they completed a cluster for the retention test under the same conditions as for pre-test and another post-test consisting of a cluster with a bar loading equivalent to that reached at the end of the acquisition phase. We assessed functional motor learning through kinematic data on bar trajectory during pulling, squat and pushing phases, using an opto-electronic motion capture system (Qualisys,16 Oqus 7+ camera) in pre and post-tests.

Results

Preliminary results indicated that the participants of the 3 groups reduced, from pre- to post-test (same weight), the area between the bar trajectory and the vertical passing through ankles during the pulling phase. They also reduced the squat height and the final deflection of the bar trajectory during the pushing phase.

Conclusion and perspectives

Further analyses of coordination and kinematics of the segments will help to better understand the beneficial effects of observation especially during the second post-test completed with a heavier load. Nevertheless, observation can be included during rest periods without disrupting learning. The use of PLD appears to be an effective learning modality.

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