Action Observation: Olympic Clean & Jerk Skill Acquisition of Novice Individuals in Virtual Reality

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ABSTRACT

Action observation (AO) involves acquiring skills through watching an expert model demonstrating said skill. Recent developments in virtual reality (VR) technology now allows for a 3D AO viewing perspective. In theory, this allows a learner to view and practice a skill without the requirement of a live demonstrator. While a 360-degree view is not possible through a 2D AO format, it is unknown if it serves as an added benefit or hinderance. **PURPOSE**: This study explored the viability of using VR for enhancing AO in novice individuals by performing an Olympic weightlifting exercise compared to those engaging in AO through a 2D format. **METHODS**: Thirty-six healthy, young novice participants were randomized into one of three groups: a 3D AO group, a 2D AO group, and a no-AO control group. Participants performed the clean & jerk exercise five times using a ten-pound barbell to assess baseline ability. Each group underwent their assigned AO paradigm for three minutes. The control group examined a poster that all groups had observed prior to their protocols. The 2D AO group viewed a video where a model was demonstrating the movement pattern from both sagittal & frontal planes. The 3D AO group utilized an Oculus Quest 2 VR headset that permitted views in a 360-degree fashion. Immediately after the learning portion, participants were asked to perform five repetitions of the clean & jerk. This cycle was done four times, with the final five repetitions serving as the post-training data set. For baseline and post training, 3D motion capture was used to assess bar kinematics and leg joint coordination. **RESULTS**: There were significant increases in bar displacement for both the 2D & 3D groups following training when compared to their baseline, indicative of worsened performance. There were no significant differences in horizontal bar displacement between groups. Those in the 2D group were significantly more likely than the other two groups to implement a three-step lift following training. Finally, during the second pull of the clean and jerk, the 2D group demonstrated a significantly greater proximal-to-distal leg joint sequencing pattern. **CONCLUSION**: Results may be attributed to the amount of information being presented to a novice individual. Future work should consider and further elucidate underlying relationships between the user and VR.