



HAL
open science

Virtual reality to investigate sport performance

Benoit Bideau, Richard Kulpa, Nicolas Vignais, Sébastien Brault, Cathy Craig

► **To cite this version:**

Benoit Bideau, Richard Kulpa, Nicolas Vignais, Sébastien Brault, Cathy Craig. Virtual reality to investigate sport performance. European Workshop On Movement Science, 2009, Lisbon, Portugal. hal-04783435

HAL Id: hal-04783435

<https://hal.science/hal-04783435v1>

Submitted on 14 Nov 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial - NoDerivatives 4.0 International License

Virtual reality to investigate sport performance

Benoit BIDEAU¹, Richard KULPA¹, Nicolas Vignais¹, Sebastien Brault¹, Cathy CRAIG²

¹ M2S Laboratory, UFR APS, University of Rennes 2 - ENS Cachan, Avenue Charles Tillon, 35044 Rennes, France

² School of Psychology, Queen's University of Belfast, Northern Ireland

✉ **Corresponding author:** Benoit Bideau

E-mail address: benoit.bideau@uhb.fr

Postal address: M2S laboratory

UFR APS, Rennes 2 University - ENS Cachan

Avenue Charles Tillon

35044 Rennes, France

Tel.: +33 (0) 2 99141775

Fax: +33 (0) 2 99141774

Type of presentation suggested: Oral Presentation

Abstract

To understand and improve performance it is important to isolate contributing factors to determine their role in player performance. Consequently, previous studies used different methodologies to access these parameters. The most common tool is the video based method, coupled or not to eyes trackers. Usually the researchers have employed the temporal occlusion paradigm, a method by which the amount of visual information presented to participants is controlled. A video of a pre-recorded sporting event is displayed and cut off at key moments. However if the temporal occlusion paradigm is accepted the methodology based on video could provide not very accurate results. Indeed, unlike virtual reality the video does not provide 3D or binocular display, not giving the player vital depth information. VR has a number of advantages over video presentation. Firstly, all factors affecting the player's judgment can be controlled and tuned in a systematic manner, ensuring reproducibility between trials. Secondly the effects of this tuning on the player's behavior can be monitored in real-time to ensure ecological validity. Thirdly tracking head movements in real time so that the player's viewpoint in the virtual environment can be updated in real time helps enhance the feeling of presence.

In order to evaluate virtual reality technology, we have compared the behavior of handball goalkeepers in a judging task for two conditions. For the first one the handball goalkeepers have to predict the final position of a ball in a goal with a video display of a throwing movement. For the second one the handball goalkeepers have been immersed in a virtual environment and have predicted the final position of a ball for the same throwing movement than the one used with video.

Key words: Virtual reality, technology, video