

# Introduction

The Expert-Performance (EP) Approach is “a guiding framework for those interested in furthering knowledge and understanding of expertise and expert performance”<sup>1</sup>

In order to obtain the most accurate reflections of human behaviour, scientific experiments must employ designs that replicate the natural environment as closely as possible.

Sport science research has often neglected this in favour of more controlled, replicable studies, though this is beginning to change...

**Aim:** Examine whether athletes perform better on tests of visual/motion perception that replicate their natural environment than ones which do not.

• Lee et al (2013) – No difference in RT but increased visual fixations of opponent in 2D condition.<sup>2</sup>

2D vs 3D



• Spittle et al (2010) – No difference in decision-making accuracy of basketball players.<sup>3</sup>

Screen Size



• Vignais et al (2009) – No difference in response time or accuracy of GK's but kinematics of motion did differ.<sup>4</sup>

Level of Detail



• Memmert (2006) – Basketball players less prone to inattentional blindness only in basketball scenario.<sup>5</sup>

Inattentional Blindness

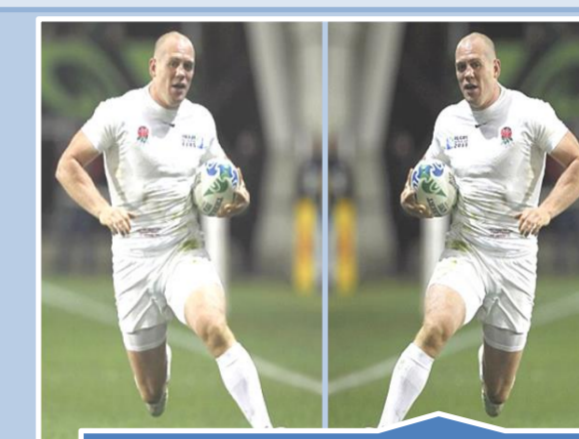


- 60 participants with average experience of >11yrs in either rugby, football, cricket, tennis, or hockey
- Performed 3 tests of visual-motion perception
  - Useful-Field-Of-View (UFOV)*
    - 3 sub-tests: single-task (ST), dual-task (DT), & dual-task-with-distracters (DTWD)
  - Motion-In-Depth-Sensitivity (MIDS)*
    - 2 sub-tests: fast & slow
  - Direction-Of-Motion-In-Depth-Sensitivity (DOMIDS)*
    - 2 sub-tests: horizontal & vertical

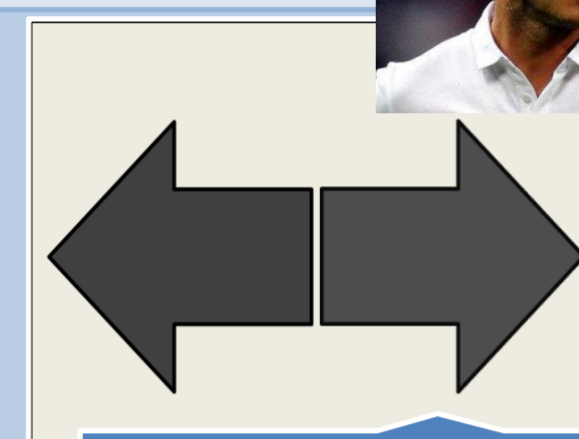
Three versions of each test were performed:



Associate (A)

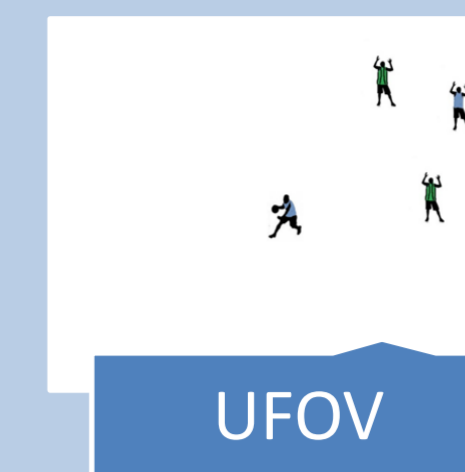


Dissociate (D)

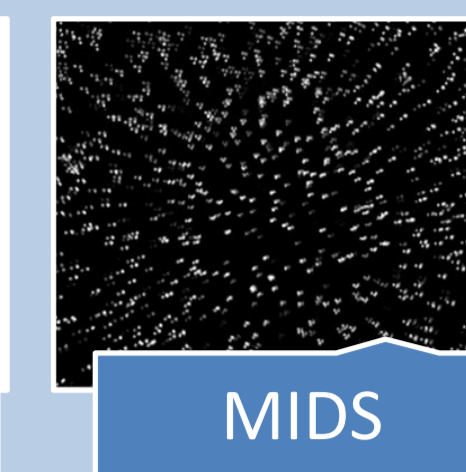


Neutral (N)

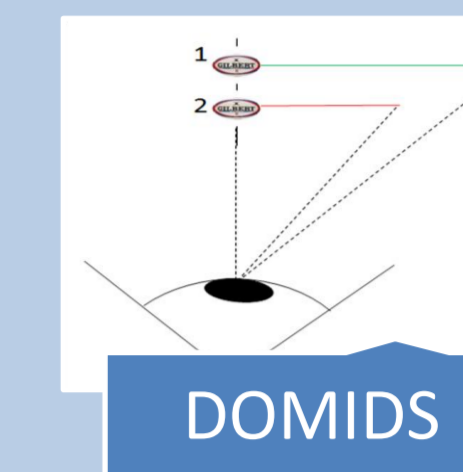
# Method



UFOV



MIDS



DOMIDS

## Statistical Analysis:

- RM ANOVA's conducted on the change in UFOV scores between the sub-tests.
- Independent samples t-tests conducted for the MIDS & DOMIDS tests.

# An Investigation into the Expert-Performance Approach Using Tests of Visual and Motion Perception

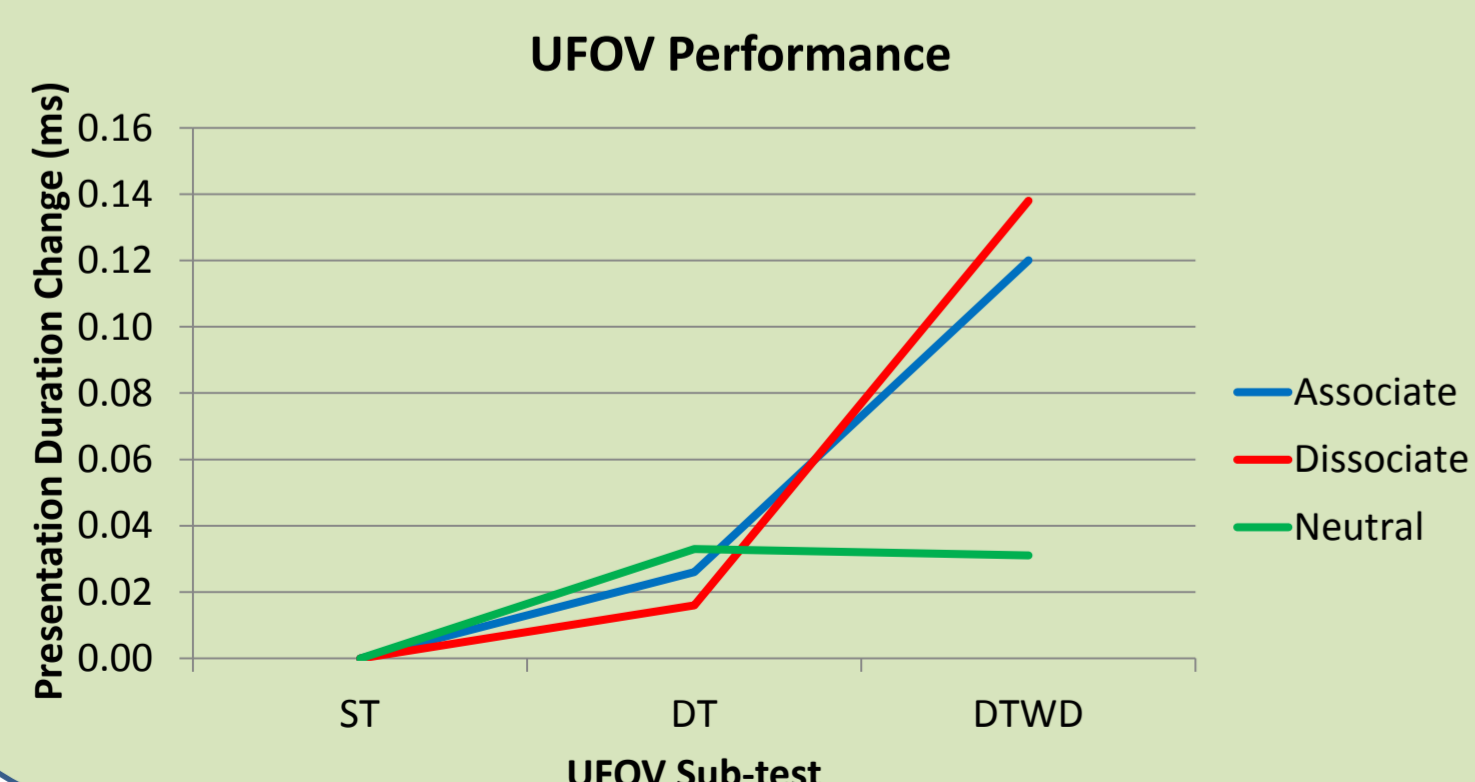
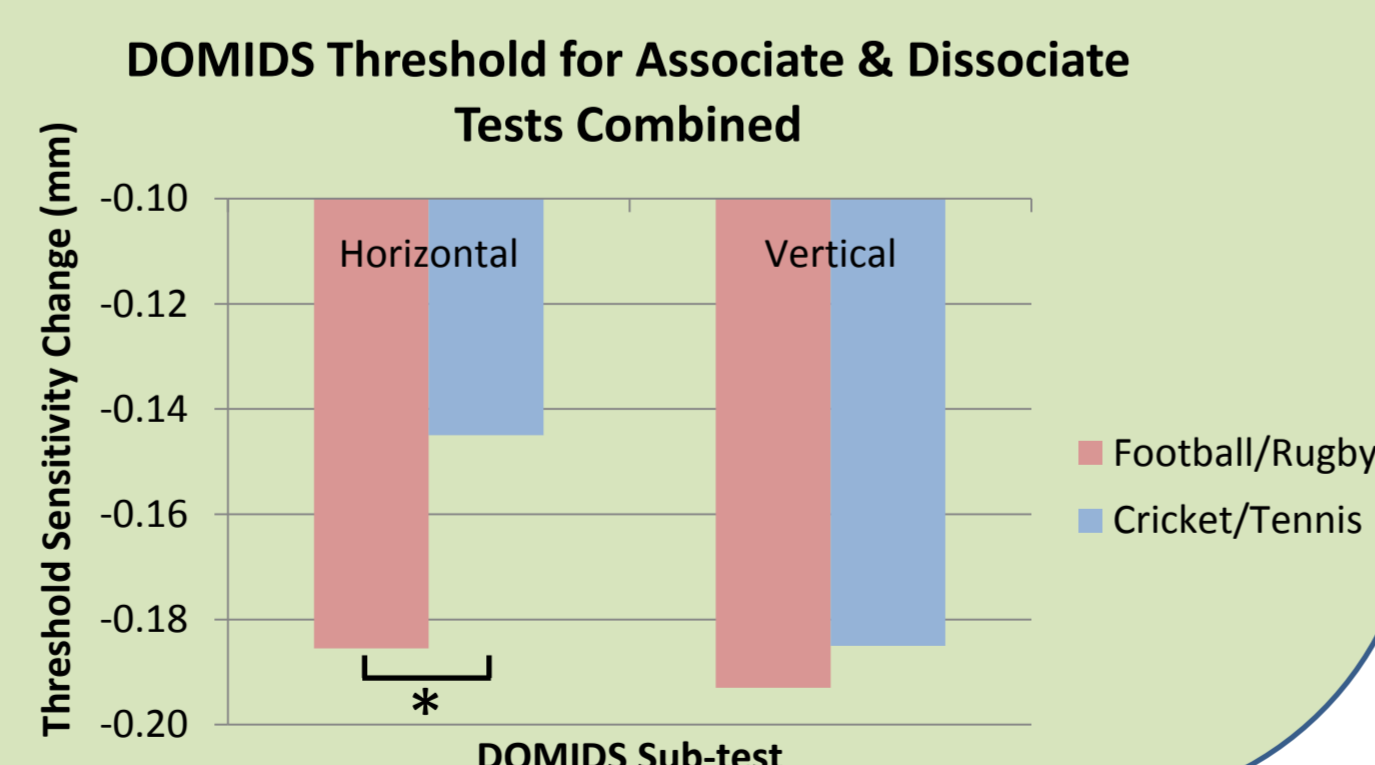
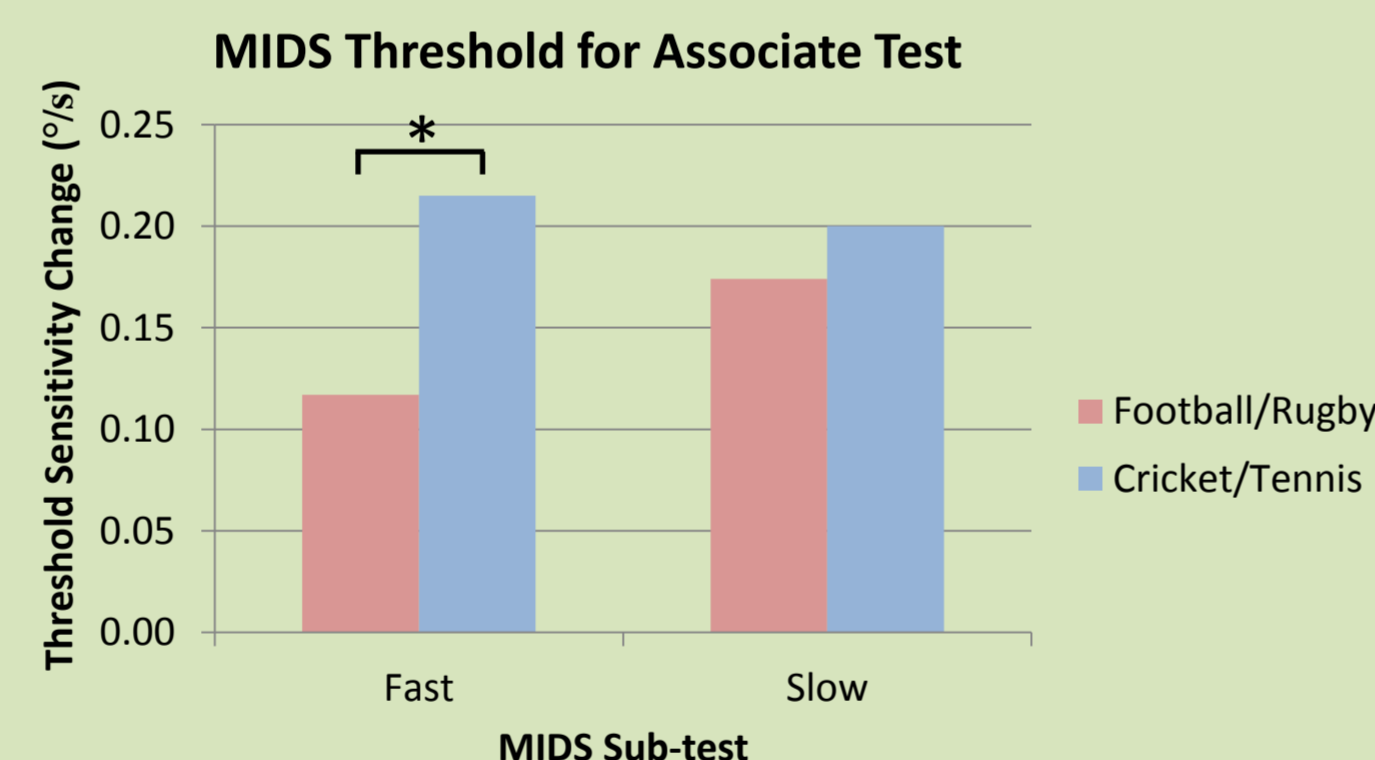
## Results

## Discussion

**UFOV:** No sig. difference in changes in UFOV scores between A and D tests. Sig. difference in change from DT to DTWD for the N test compared to both the A and D tests.

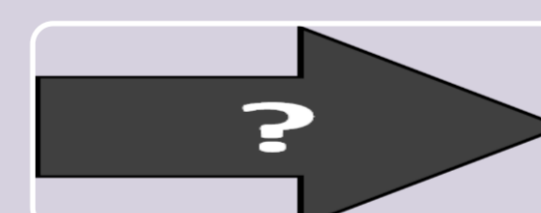
**MIDS:** Sig. higher threshold in the fast sub-test (A test) for fast-sport participants compared to slow-sport participants.

**DOMIDS:** Sig. higher threshold in the horizontal sub-test (D test & A/D collapsed) for horizontal-sport participants compared to vertical-sport participants.



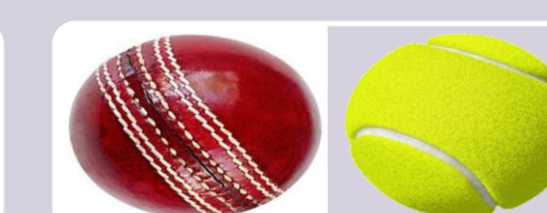
## Key points:

- Matching the stimulus image to that of the participant's sport did NOT effect performance in any aspect of the UFOV test.
- Individuals who play fast-paced sports (i.e. cricket & tennis) have a GREATER threshold sensitivity for high speeds when compared to those who play slow-paced sports (i.e. football & rugby).
- Individuals who play horizontal-based sports (i.e. football & rugby) have a GREATER threshold sensitivity for horizontal directions when compared to those who play vertical-based sport (i.e. cricket & tennis).



UFOV Neutral Test

Visual contrast considerably greater



MIDS Associate Test

Possible motivation effects



Importance of Motion

Reflects dynamic nature of sport



Skill Level

Can we predict differences in ability?



Sport Classification

Is tennis mainly vertical?

**TAKE HOME MESSAGE:** There is some support for employing the EP approach in tests of visual perception, with particular emphasis on the importance of motion.

1. Williams, A.M., & Ericsson, K.A. (2008). From the guest editors: How do experts learn? *Journal of Sport & Exercise Psychology*, 30, 653-662.  
 2. Lee, M.J.C., Tidman, S.J., Lay, B.S., Bourke, P.D., Lloyd, D.G., & Alderson, J.A. (2013). Visual search differs but not reaction time when intercepting a 3D versus 2D videoed opponent. *Journal of Motor Behavior*, 45(2), 107-115.  
 3. Spittle, M., Kremer, P., & Hamilton, J. (2010). The effect of screen size on video-based perceptual decision making tasks in sport. *International Journal of Sport and Exercise Psychology*, 8(4), 360-372.  
 4. Vignais, N., Bideau, B., Craig, C., Brault, S., Multon, F., Delamarche, P., & Kulpa, R. (2009). Does the level of graphical detail of a virtual handball thrower influence a goalkeeper's motor response? *Journal of Sports Science and Medicine*, 8, 501-508.  
 5. Memmert, D. (2006). The effects of eye movements, age, and expertise on inattentional blindness. *Consciousness and Cognition*, 15, 620-627.