

Top-level football refs are better at spotting fouls because of enhanced visual perception

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Credit: Gustavo Rezende/public domain

Top-level professional football referees have enhanced visual perception, which means that they are better at spotting foul play and issuing the correct disciplinary action than lower-level referees, according to new research published in the journal *Cognitive Research*.

The researchers, from Belgium and the UK, had 39 football referees

from the top and lower leagues in Belgium watch staged videos of fouls being committed from the point-of-view of a referee on the football pitch. Eye-tracking technology was used to assess their visual-search behaviour - that is the location that the referees' eyes fixated on and for how long.

Professor Werner Helsen, co-lead author from the University of Leuven in Belgium, said: "Our results show that elite referees have visual-search behaviour patterns that make them better at assessing foul play situations in football compared to lower league referees. When watching open play fouls being committed, elite referees spend more time fixating on the body part involved in the foul than other areas, suggesting that they are focusing on and interpreting the most crucial information within their visual display."

Visual-search behaviour is a primary skill utilised by professional athletes that enables them to coordinate perceptual-cognitive function with motor skills. Referees also rely heavily on visual-search behaviour in order to rapidly translate what they see into a correct decision based on the rules of the game. When asked to state if they thought the open-play foul committed deserved a disciplinary sanction (no card, yellow card or red card), elite referees made the correct decision with an accuracy of 61%, compared to 45% amongst lower level referees.

Dr Jochim Spitz, co-lead author, said: "Visual-search behaviour is an in-built cognitive function that can be improved through training and development. Understanding what it is exactly that makes elite referees able to make better decisions than lower-level referees could help devise training programmes specifically aimed at improving visual-search behaviour."

The video clips used in this study were filmed with the help of competitive football players who were tasked with simulating a variety

of foul play scenarios including fouls in open play and from corner kicks. The action was filmed from approximately 10 meters away to mimic the proximity of a referee to the game in a real life situation. In order to make the simulations as natural as possible, no specific instructions were given to the players related to the type of foul that should be executed. A total of 20 videos were made, 10 open-play situations and 10 corner-kick situations, out of which three showed no foul play.

In the open-play and corner-kick scenarios, there was no difference between the numbers of locations that the referees focused on when watching the videos but, importantly, the elite referees did spend more time fixating on the contact zone between the attacker and the defender than the non-elite referees. Analysing the data collected from incorrect decisions made by referees, it was concluded that the fixation time plays an important role translating perceived incidents into a correct interpretation according to the 'Laws of the Game'.

Professor Werner Helsen added: "We can speculate from our results that the level of experience in elite referees is translated into long-term memory which allows their visual-search behaviour to be driven by acquired knowledge. Sub-elite referees on the other hand have less experience and seem to apply a more random control of visual fixation".

More information: Jochim Spitz et al, Visual search behaviors of association football referees during assessment of foul play situations, *Cognitive Research: Principles and Implications* (2016). [DOI: 10.1186/s41235-016-0013-8](https://doi.org/10.1186/s41235-016-0013-8)

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