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Shhh... We're talking about the Quiet Eye!

A Perceptual Approach to the Transfer of Skill: Quiet Eye as an Insight into Perception-Action Coupling in Elite Football Goalkeepers – Methodological and Feasibility Considerations

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Rationale and Aims

About the continued theorising and objective epistemological approach to perceptual research (Michaels and Rietveld, 1995), there remains little clarity regarding what information athletes use to direct decision making in performance settings and how skill is transferred from training to performance.

The role of perceptual action coupling within decision making in team sports has been discussed, given length (Davids et al., 2007; Pinder et al., 2011), with some researchers reaching the decided levels do not necessarily have superior visual skill, but rather are able to utilise key sources of information, independent expertise in a particular skilled actions (Vickers, 2008). The theoretical advantage that these act to acquire, single action state control tasks is the hope of elucidating data to support a change in behaviour or one given number of constant modifications (Gibson, 1956; Williams, Singer and Parkinson, 2010; Vickers et al, 2011). However, recent remains in isolation of the research world.

The Quiet-Eye (QE) has become increasingly popular (Vickers, 2016), it defines the final focus towards a specific location or object within 3° of visual angle or less for a minimum of 100ms (Vickers, 2016). It is reasonable to suggest that QE describes the variable in which to examine the relationship between perception and action (Piryx and Vickers, 2016). A Schematic Instruments – Eye Tracking Glasses (SM-ETG) binocular system will be employed within an elite level goalkeeping context. QE data will be collected in three different practice environments and compared to QE measured taken in a representative training situation. QE data will be collected by means of an objective, ecological dynamics as presented in the Environment Design Continuum (Newcombe et al, in preparation).

1. To understand the gaze behaviour of elite goalkeepers in order to determine an appropriate approach to training that represents elite gaze patterns and transfer to competitive performance through the use of QE

2. To use the Quiet Eye as an objective measure in order to understand their transfer occurs between training and performance from the means of perceptual alignment.

The Infinite Variable and Beyond

There is a requirement to view the QE beyond an isolated and interventional approach, for which QE will become used as a key perceptual tool to measure the transfer of skill from training to competitive performance (Rietveld et al., 2011; Davids & Araujo, 2010). Approaching the design of research practices of the study of perception must be categorised under a key experimental research principle. Originally suggested by Egen Tunnell (1998), representative design practices for any experimental task must first involve significant information of the researched task.

Adopting a probabilistic functionals perspective will provide the necessary scope of analysis towards QE behaviour under principles of Ecological Dynamics (Brunswik, 1956; Pinder, 2011). Due to the nature of information in complex environments facing variable and emergent, practice and training conditions must allow for a field of affordances that creates opportunities for relative game actions to occur (Brunswik and Rietveld, 2014).

This study attempts to view the QE under critical richness in variable, and in which to replicate the natural psychological conditions of the studied task. Through this, it allows the validity of the QE to be stretched further towards the design of sporting training environments that can replicate the visual energy across available performance conditions (Vickers, 2008).

Tunnel Vision

Williams, Jenelle and Davids (2004) discussed how there may be benefit in understanding visual behav by any of the Interacting constraints that shape emergent behaviour. Key interventions were cited by Davids and Araujo (2010), as an interesting commentary presented by the authors, they questioned the QE scope, raising concerns that the QE has become the simple answer in understanding decision making.

A vast amount of the QE literature has utilised QE as a tool for perceptual training in sport. For example, QE training interventions have been used in an attempt to train the visual search strategies of motorists within similar tasks used by their expert counterparts. Hitherto and Vickers (2001) study demonstrated the potential of QE based training interventions for which significant improvements were noticed during these simulations and inter-game, this is further supported by Schindler and Lee (1995) who observed changes with individual players, for which improvements in gaze durations were noted. Causer, Holmes and Williams (2011) again employed a training intervention to demonstrate the use of QE as a tool for perceptual training; yet there are numerous examples where over the duration of QE training interventions, Buus (2014) suggested in his commentary to Vickers (2016) that there are limited trials and short retention periods across a number of training interventions. It is clear from the literature that the design of research practices of the study of perception must be categorised under a key experimental research principle. There is a wealth of information in complex environments facing variable and emergent, practice and training conditions must allow for a field of affordances that creates opportunities for relative game actions to occur (Brunswik and Rietveld, 2014).

While there is little to no QE research, understanding environments and games with developing constraints in complex environments, and the role of interacting constraints on decision making (Gibson, 2008), the Quiet-eye (QE) must be understood, and the focus on the role of interacting constraints on decision making (Gibson, 2008). Evaluating the link between QE and contextual constraints and games with developing constraints in complex environments, and it is the role of interacting constraints on decision making (Gibson, 2008) on the Quiet-eye (QE); however, a vast proportion of this branch of research has highlighted the resultant gaze behaviour from the interacting constraints compared across trials and individual, rather than when given is allowed by the environments that shape their actions.

"The QE is defined as the final fixation towards a specific location or object within 3° of visual angle or less for a minimum of 100ms" (p. 4) Vickers (2016)

Proposed Methodology

4 Elite Goalkeepers will use SM-ETG (Eye Tracking Glasses) in 4 training environments to locate the QE under an emerging number of constraints that create opportunities for action (Newcombe, 2016; Reinhoff, 2017). The trials will be evaluated via a correlational measure (representative match simulation) (Vickers et al., 2011), which will be analysed against 3 different points on the Environment Design Continuum (Newcombe et al, in preparation).

Training environments will be designed following principles of environment design as designed in Newcombe et al (in review) (Fig 1)

Fig 1 The Environment Design Continuum (Newcombe et al, in preparation)

Trial 1 – Practice Opposed
Trial 2 – Practice Variable
Trial 3 – Small-Sided Games
Trial 4 – Representative Competitive Situation 1 and 11

Each Goalkeeper will perform 10 interceptive actions per training environment over a 6 week period with video footage from the SM-ETG and an external camera to capture the skilled action will be collected. The video will be clipped and digitally coded (Via Sporstats Gameplaywear, BeGaze from trackidy ands VAA analysis tool from QuickEyeLuxscouts.com) to establish the start and end of each skillful action.

QE duration (Trial 1, 2, 3, 4) x boot Reaction times – factorial ANOVA
QE location: Descriptive statistical analysis
Level of fidelity: MeanQE duration (Trial 1 or 2) x MeanQE duration Trial 4 x QE location – factorial ANOVA (Pryx and Vickers, 2011)

Considerations and Critical Questions

It is worth considering that individual players may possess variability in eye movements and not follow optimum patterns for learning, but a response to the constraints (Piryx and Vickers, 2011). The QE is a holistic measure and will demonstrate the learning effect size the variable with the highest level of fidelity to that of competitive performance.

Variation judged via an effect size measure. The trial with the smallest effect size will be determined as the one with the highest level of fidelity to that of competitive performance.

Conclusions

The Quiet Eye has become increasingly popular (Vickers, 2016), it defines the final focus towards a specific location or object within 3° of visual angle or less for a minimum of 100ms (p. 4) Vickers (2016). The QE is defined as the final fixation towards a specific location or object within 3° of visual angle or less for a minimum of 100ms" (p. 4) Vickers (2016).