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Timing of Visual Exploratory Activity in Skilled and Novice Football Players: An Active Inference Perspective

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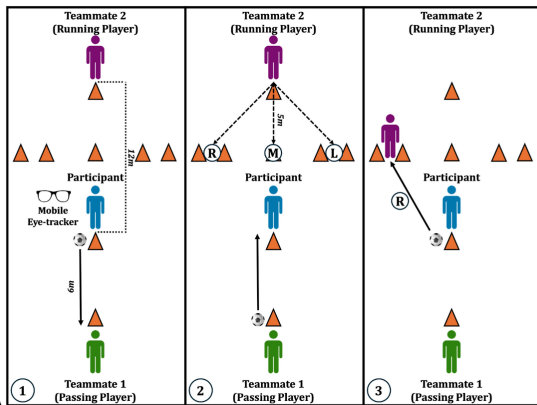
Introduction

- Skilled athletes make more accurate and faster responses than novices. They rely on different visual search strategies that facilitate anticipation (Mann et al., 2007)
- In football, skilled players conduct Visual Exploratory Activity (VEA) to scan their surroundings, which supports the specification of opportunities for action, and the preparation of upcoming actions (Jordet, 2005)
- Based on the Active Inference framework (Friston et al., 2010), we propose that skilled players optimize the timing of their VEA by identifying key moments to shift attention in relation to unfolding events in order to minimize uncertainty

How do skilled players manage competing visual demands during a decision task ? Does this support adaptive behaviour ?

Method

Typical match-play scenario



Participants

23 Skilled vs 21 Novices



Apparatus

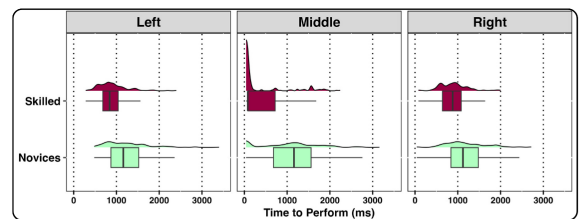


Tobii Pro Glasses 3

Variables

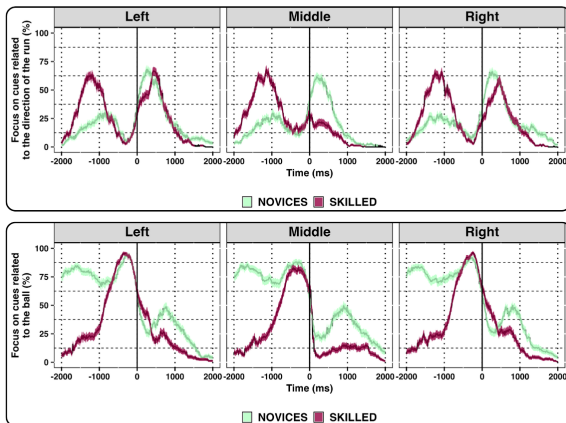
- **Performance:** Time to perform the task
- **Eye-tracking:** Location of gaze during task performance

Results & Discussion : Performance



- Skilled players performed the task faster than novices, especially in the middle condition
- Skilled players use more accurate generative models to predict and adapt to task demands

Results & Discussion : Eye-Tracking



- Skilled players focused on run direction cues earlier than novices, with a longer duration of focus in the middle condition
- Novices focused on the ball more than skilled players
- Skilled players manage to balance exploration (reducing uncertainty) and exploitation (performing the task effectively) to support adaptive behaviour. Through sustained practice, athletes optimize their performance by timely and flexibly shifting visual attention to task-relevant information

Conclusion

- Distinct VEA patterns were observed between Skilled and Novices
 - Skilled players initiated their search for subsequent actions earlier and showed a more efficient attentional shifts between task-relevant cues
 - Novices adopted a more serial and reactive approach to task performance

Skilled VEA is defined not only by scanning frequency, but also by the ability to identify optimal moments to shift visual attention between task-related cues

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