Cognitive processes underlying anticipation in a context-oriented task

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Cognitive Processes Underlying Anticipation in a Context-Oriented Task

While the way in which expert performers extract and process kinematic cues from an opponent’s postural orientation is well documented, we investigate the cognitive processes involved in anticipation based on contextual information alone (i.e., in the absence of kinematic cues). Long Term Working Memory theory (Ericsson and Kintsch, 1995) states that through extended experience and practice, high-skilled performers can encode and retrieve information from a knowledge representation stored in long term memory. Research suggests that superior anticipation performance can be partially attributed to this ability to rapidly encode and retrieve domain-specific representations (e.g., Roca et al., 2011). High- ($n = 10$) and low-skilled ($n = 10$) tennis players watched animated footage of rallies from matches occluded at the opponent’s racket-ball contact and anticipated ball bounce location (depth and direction). Animated footage, which was generated using player movement and ball trajectory data, omitted player kinematics so that only contextual information was available. Retrospective verbal reports were collected and coded using Ericsson and Simon’s (1993) protocol analysis technique. High-skilled participants’ response accuracy scores (depth and direction combined) were significantly higher ($p < .05$) than less-skilled participants ($M = 71.5\%, \ SD = 10.6\%$ vs. $M = 50\%, \ SD = 12.5\%$). Both groups performed significantly better than chance ($p < .05$), indicating the importance of contextual information when making such judgements. In support of Ericsson and Kintsch’s (1995) LTWM theory, high-skilled participants made more evaluation and prediction statements than less-skilled participants. Moreover, these high-skilled athletes’ verbal reports were more detailed. These findings suggest that high-skilled performers employ more complex domain-specific memory representations than less-skilled performers when anticipating in the absence of kinematic cues. Results have implications for the testing and training of anticipation in sport and other temporally constrained domains.