THE ROLES OF CONTEXTUAL PRIORS AND KINEMATIC INFORMATION DURING ANTICIPATION: TOWARD A BAYESIAN INTEGRATION MODEL

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It has been suggested that skilled athletes integrate prior situation-specific information (i.e., *contextual priors*) with emergent environmental information to improve anticipation. However, our understanding of how athletes weigh up the available sources of information to inform their judgements during dynamic and temporally constrained tasks is limited. We present a series of experiments using a video-based soccer task to examine the integration of contextual priors and progressively unfolding kinematic information when anticipating the actions of an oncoming attacker. In one experiment, expert and novice soccer players performed the task with and without prior information about the attacker's action tendencies (dribble = 67%, pass = 33%). We recorded gaze behaviours and ongoing anticipatory judgements during task performance. Early in the trial, when kinematic information from the attacker was less relevant, the provision of contextual priors biased gaze behaviours and anticipatory judgements in experts, but not novices. Toward the end of the action sequence, experts, but not novices, used confirmatory or conflicting kinematic information to update their judgements. These findings align with the Bayesian framework for probabilistic inference which predicts that the reliance on contextual priors and current environmental information is subject to the relative uncertainty associated with available sources of information. To further test this prediction, we carried out two follow-up studies using the same anticipation task. In one, we manipulated the contextual priors by altering the strength of the attacker's action tendencies. In another, we used a temporal occlusion paradigm to manipulate the availability of kinematic information. The reliance on contextual priors

increased when the uncertainty associated with evolving kinematic information increased and vice versa. Collectively, our novel findings provide support for a Bayesian integration model of how athletes shape their anticipatory judgements over time in dynamic and temporally constrained situations.