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I see where this is going: Modeling the development of infants' goal-predictive gaze

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Abstract

From about six months of age onward, infants observing an action, such as a grasp, start to shift their gaze from the moving agent to the goal before the action is complete. A variety of factors that influence such goal-predictive gaze have been identified. However, the underlying cognitive processes are heavily debated. We propose that our minds structure sensorimotor dynamics into probabilistic, generative event-predictive models, and, choose actions with the objective to minimize predicted uncertainty. We implement this proposition by means of event-predictive learning and active inference. Trained on manual object-manipulations, the generation of goal-predictive gaze emerges: The model starts fixating the anticipated goal at the start of an observed event when a familiar agent (i.e., a hand) is involved. Meanwhile, the model keeps tracking unfamiliar agents (e.g., a claw) performing the same movement. We conclude that event-predictive learning combined with active inference may be critical for eliciting action-goal predictions.