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Exploring Lay Theory of Mind: Idiosyncratic Models of Mentalisation

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Abstract

Understanding observed actions (mentalisation) is thought to rely on latent causal models. However, computational approaches typically employ fixed, experimenter-defined structures tested in artificial tasks. In this study, participants provided probabilistic beliefs about player types, intentions, and actions, then categorised naturalistic gameplay videos by intention or player type, reporting their subjective causal theories. We compared direct versus latent-inverse inference, crossing individual versus aggregate priors, and selecting latent variables according to participants' theories. Latent models outperformed direct models when predicting player type. Intention aggregate priors improved accuracy across metrics. To contextualise the estimates, significant video features and respective weights were elicited from a subset of the sample. Although models weighting the inference-latent variable relation consistently outperformed alternative weighting schemes, supplementary feature-based weights did not significantly alter estimates. Together, these findings demonstrate that incorporating participants' subjective causal structures through cross-path weighting offers a novel, empirically grounded framework for understanding mentalisation in naturalistic settings.