

Figure 1. Replication of EGE-IGE experiment of Ranjan & Smith (MLMC 2018). (a) Experimental set-up. (b) Decomposition of total error into EGE (visuomotor rotation) and IGE (intrinsic motor noise) components. (c-d) Population-averaged adaptive responses were binned based on the level of EGE (shade of red) and IGE (shade of blue) and plotted as a function of EGE in c, and as a function of IGE in d (where data are shifted right due to a small counter-clockwise reaching bias of less than 1° across participants). The vast majority of the variance in adaptive responses (99.1%) was explained by EGE. (e) Linear regression coefficients from an analysis of unbinned data. Error bars represent bootstrapped 95% CIs and dots represent individual participants.

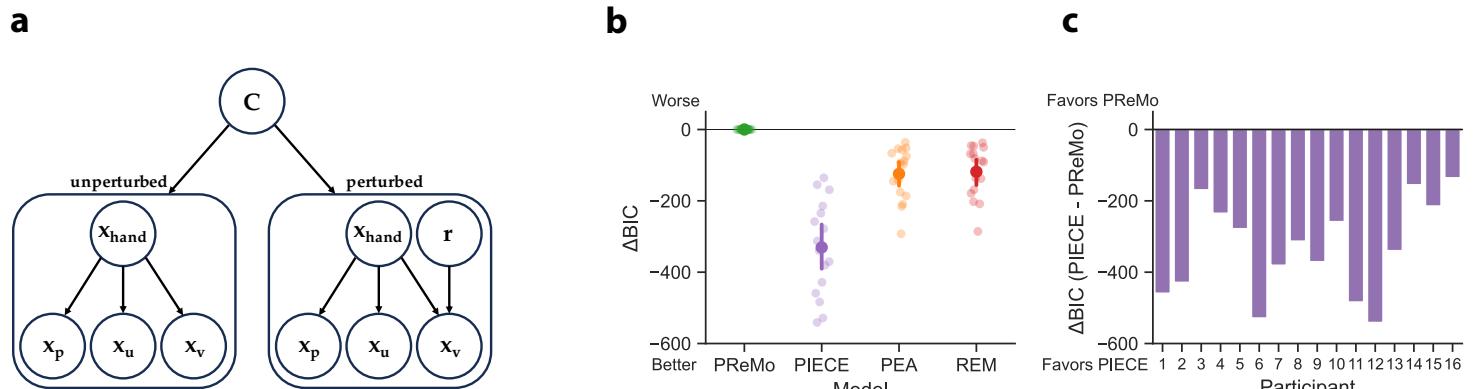


Figure 2. Generative model and model selection. (a) Graphical representation of PIECE. The ideal observer uses proprioceptive (x_p), motor prediction (x_u), and visual cues (x_v) to compute posterior probabilities of C , the causal node, and whether the feedback was perturbed or not. In the perturbed case, visual feedback is a function of both the actual hand position, x_{hand} , and the rotation, r . The posterior on C weights the observer's estimate of r , which is computed with the Kalman filter. (b) Direct comparison of BIC scores of each model to PReMo's BICs. Lower scores indicate a better model fit. (c-e) For all 16 participants, PIECE outperformed each of the other three models.

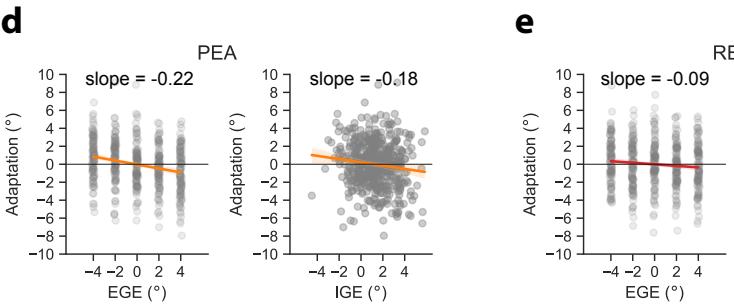
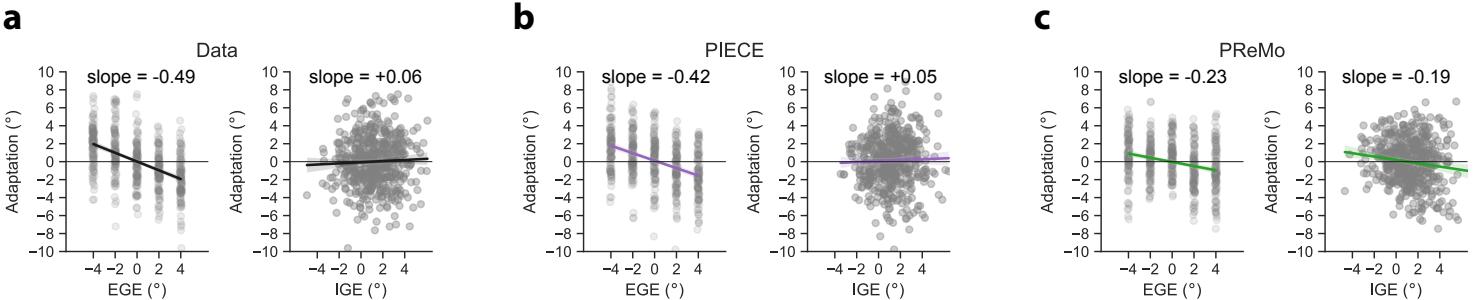


Figure 3. Posterior predictive check via simulation of adaptation data using MLEs of each model's parameters. (a) Representative data from a single participant (P13). Adaptive responses are a linear function of EGE and remain statistically independent of IGE. (b) PIECE model mimics the empirical data: Slope values indicate high sensitivity to EGE and insensitivity to IGE. (c-e) PReMo, PEA, and REM all fail to capture the accurate parsing of errors into EGE and IGE. Gray dots represent adaptation measures of individual trials. Thick colored lines and shading represent line of best fit and associated bootstrapped 95% CI, respectively.