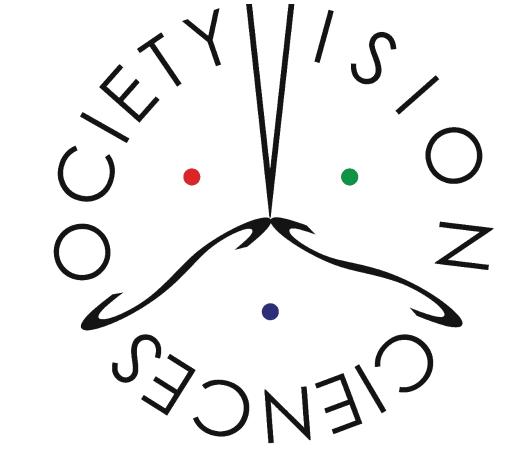


## Effects of sensorimotor adaptation on confidence

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### Questions

- Does confidence recalibrate at the same rate as the motor plan?
- Is the calculation of confidence changed during motor adaptation?

### Background

Proprioception is not always used when making a confidence judgment in the absence of adaptation if proprioception is unreliable\*



Apparatus: participants made

Three phases per block:

 $=20^{\circ}$ 

unseen-hand reaches on a tablet

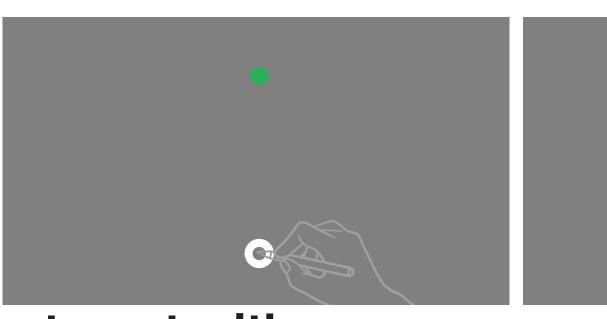
perturbation ON

trial

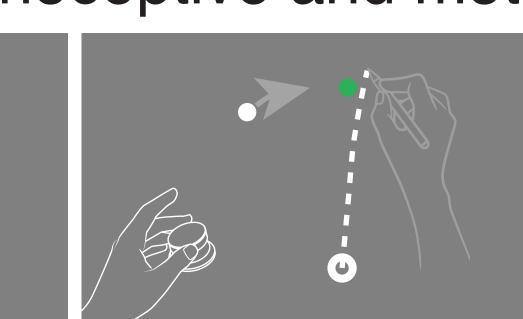
Fassold ME, Locke SM, Landy MS (2023) Feeling lucky? Prospective and retrospective cues for sensorimotor confidence. *PLoS Comput Biol* 19(6): e1010740.

### **Behavioral Methods**

Motor-awareness task to fit proprioceptive and motor uncertainty



target with go-cue reach to target (always at 90°)

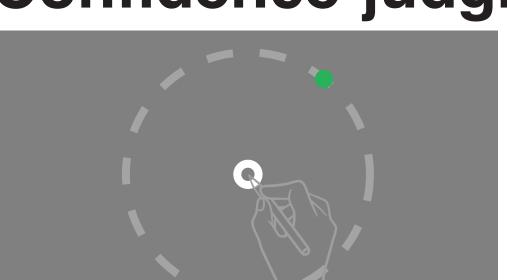


use dial to move visual cursor to perceived hand angle



report perceived hand angle with a button press

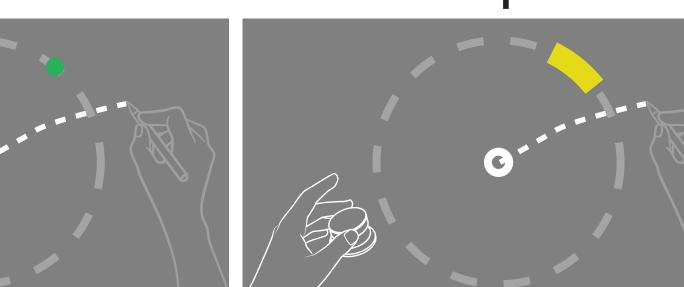
Confidence-judgment task with 20° rotation perturbation



(any angle possible)

washout

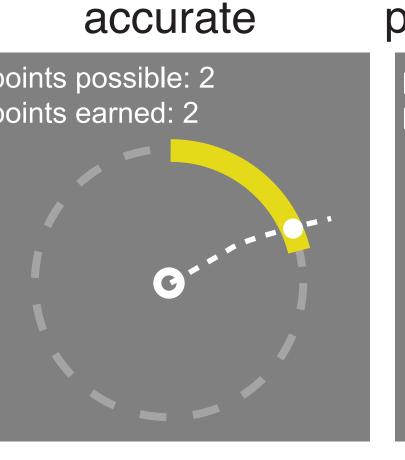
target with go-cue reach to target

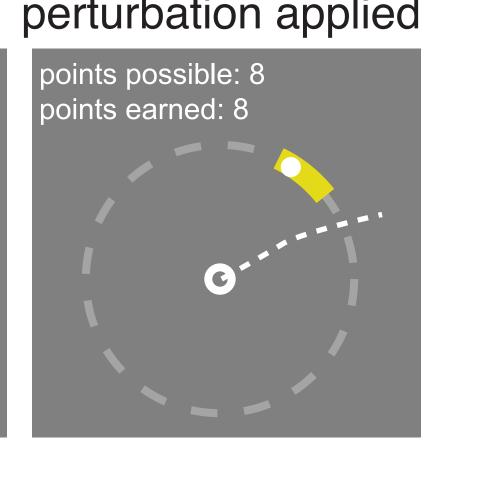


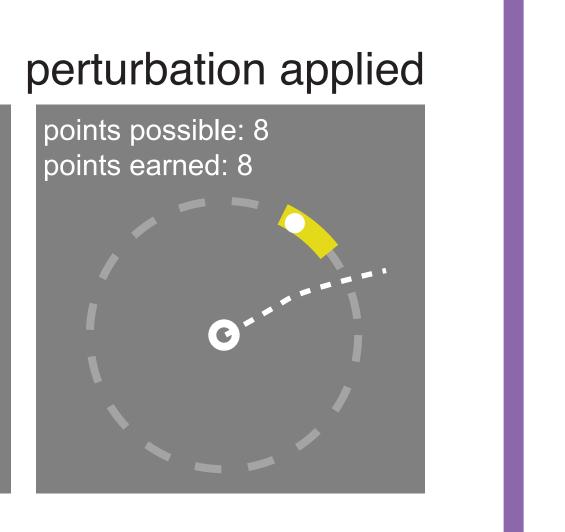


view feedback with perturbation

Possible L confidence and feedback:

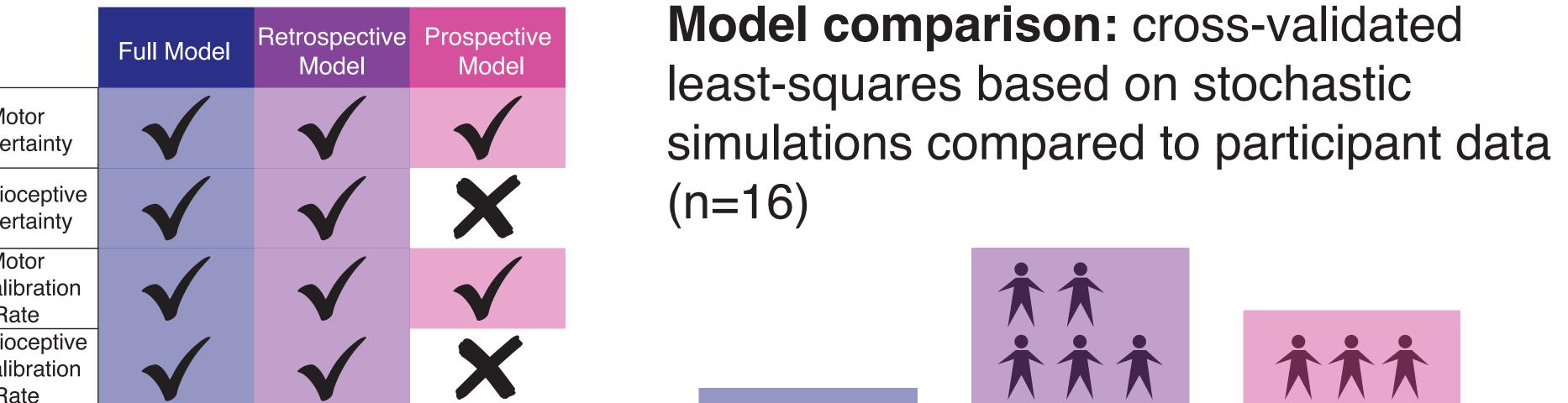




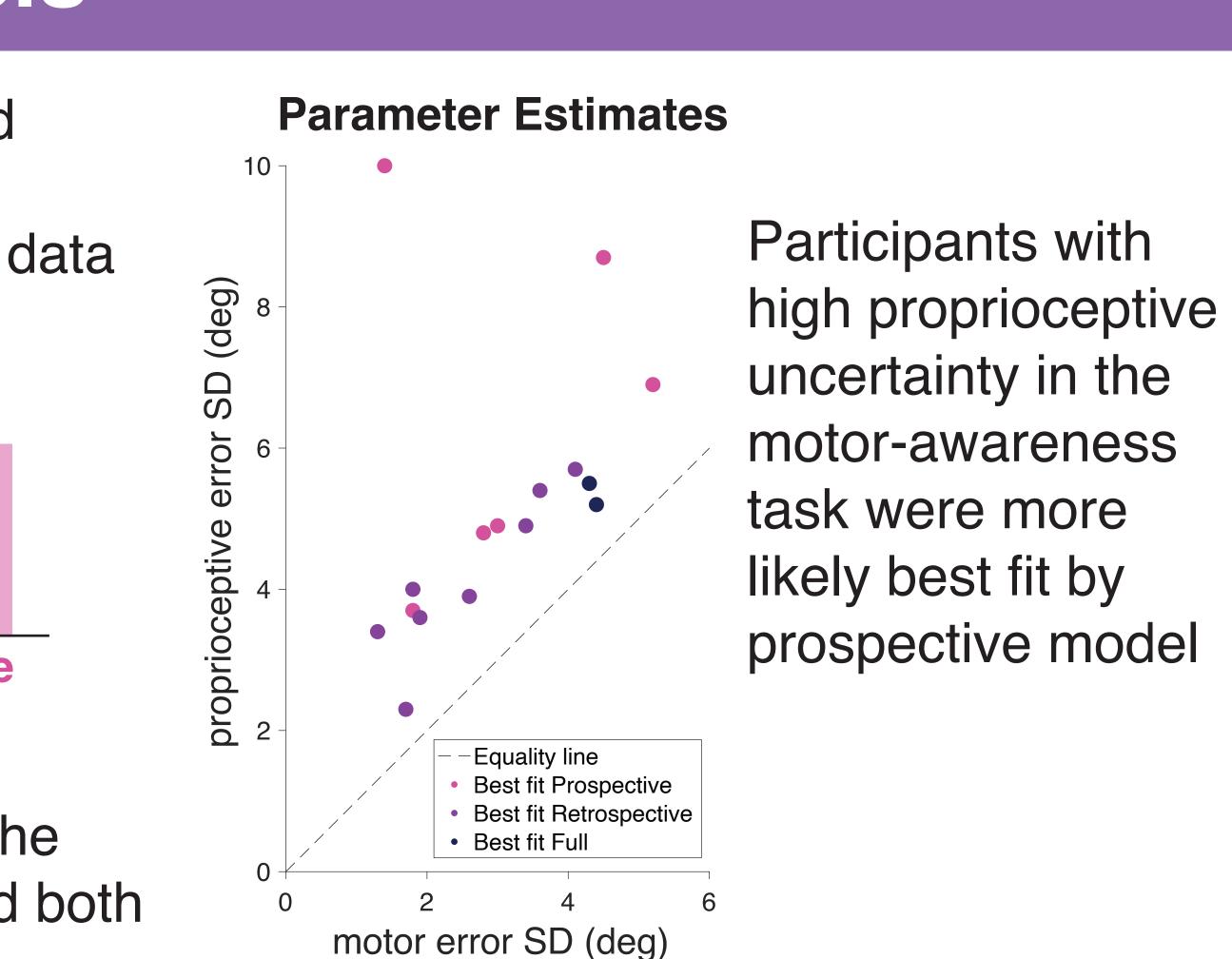


# Behavioral Results clearly visible trial number within Motor-awareness data: notable individual differences in proprioceptive uncertainty Confidence Feedback Error Average +/- SEM of 12 blocks Confidence-judgment data: confidence adapts more sluggishly than the motor plan after the perturbation is applied Reaction times: Reaction time increases during adaptation following a similar pattern to confidence

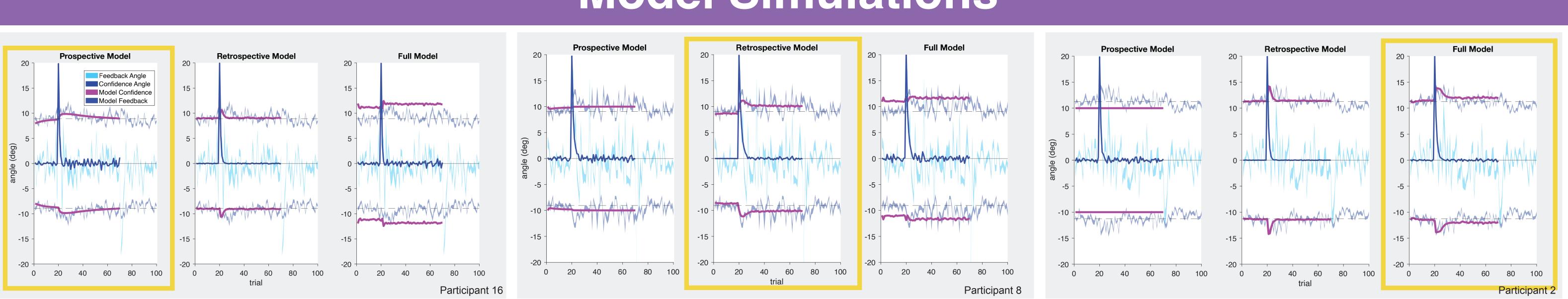
### Bayesian Models



Models: the prospective model used only prior-to-the-trial information, the retrospective used only trial-specific information, and the full model used both



### Model Simulations



Simulation based on best-fit parameters for each model compared to three participant's data, who each were best fit by one of the three models (yellow outline).

#### Conclusions

- Confidence reacts more slowly to a perturbation than the motor plan.
- Participants are more likely to use proprioception when calculating sensorimotor confidence during a task that requires motor adaptation, as trial-specific information becomes more valuable while adapting.

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