Priors More Strongly Weighted in Confidence than in Decisions...

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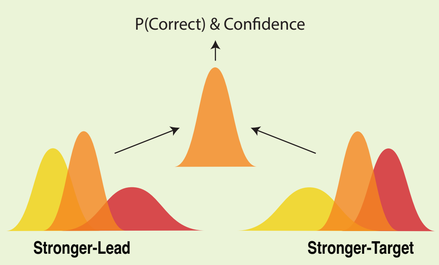
Introduction

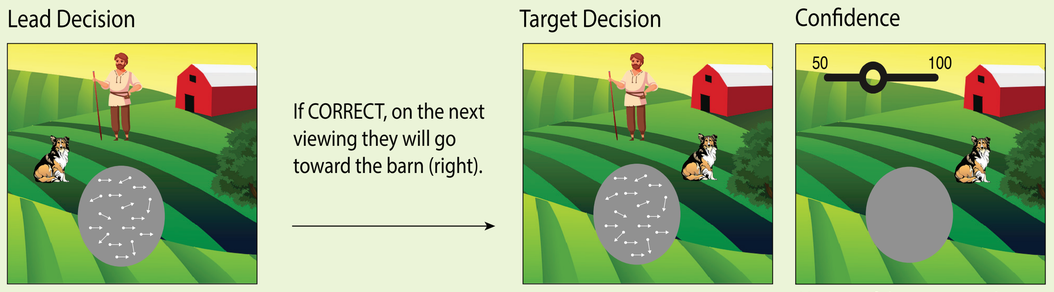
Standard Bayesian models consider both decisions and confidence to be based on the precision-weighted integration of priors and likelihoods. This assumes that priors are integrated optimally and equally in decisions and confidence. However, this must be tested. Here, in three experiments, we examine decision and confidence behaviour and test the Bayesian confidence model under informative priors.

Conditions



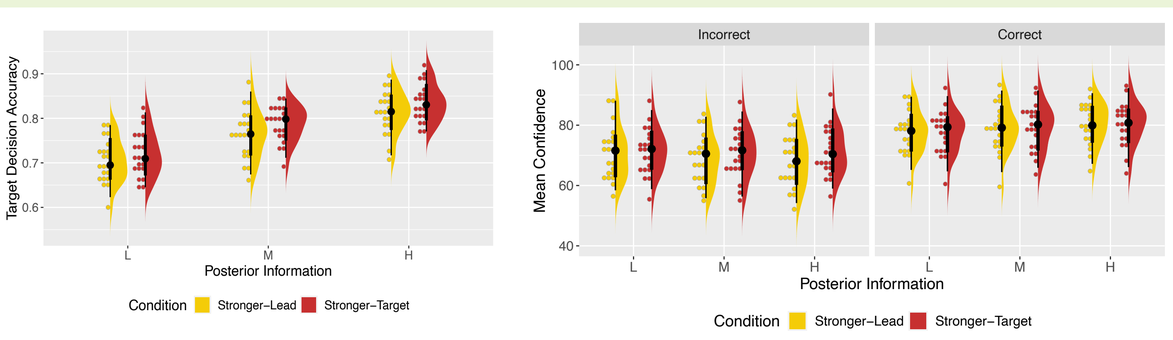
Posterior Level	Condition: Stronger-Lead		Stronger-Target	
Low	M	L	L	M
Medium	H	L	L	H
High	H	M	M	H

Paradigm



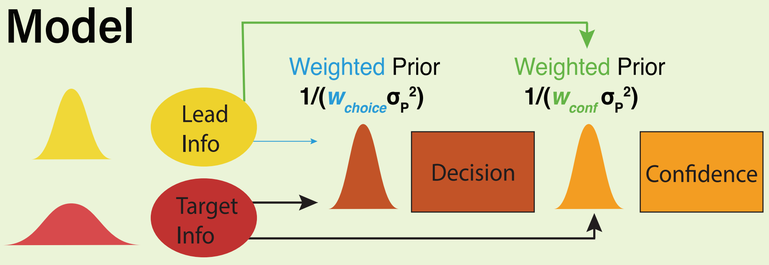
Presented at ASSC25

Behavioural Results



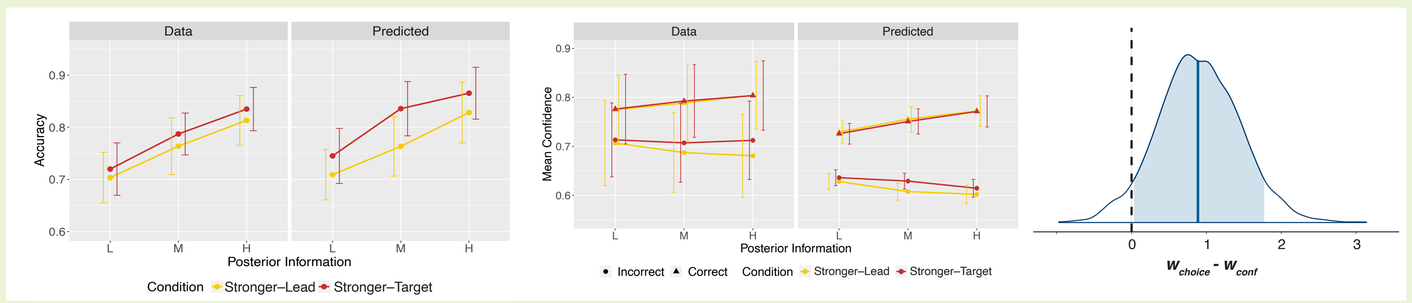
- lower accuracy in Stronger-Lead condition suggests **underweighted priors in decisions**
- interaction between response accuracy and condition suggests **stronger weighted priors in confidence than in decisions**

Model



- Free Parameters: w_{choice} , w_{conf} , b (conf bias)
- Fit hierarchically using STAN

Model Results



- same as behavioural
- $w_{choice} > 1$ (underweighted)
- $w_{conf} < w_{choice}$

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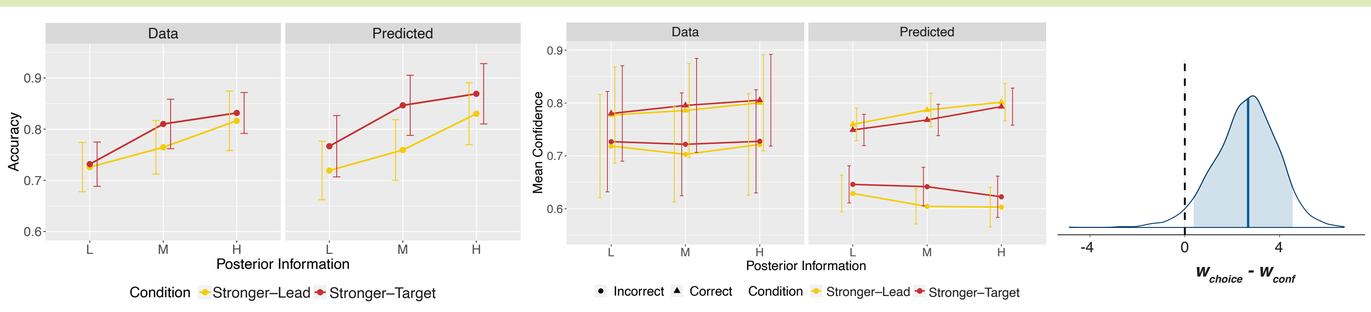
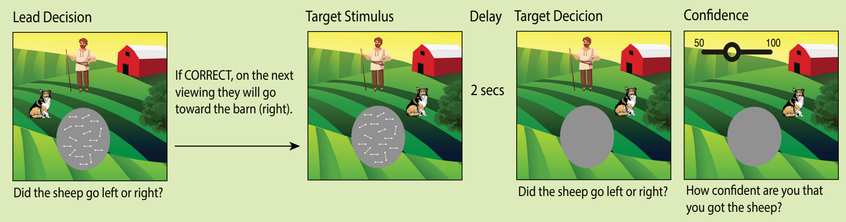
... Even Without Differences in Processing Time



Results
- $w_{choice} > 1$
- $w_{conf} < w_{choice}$

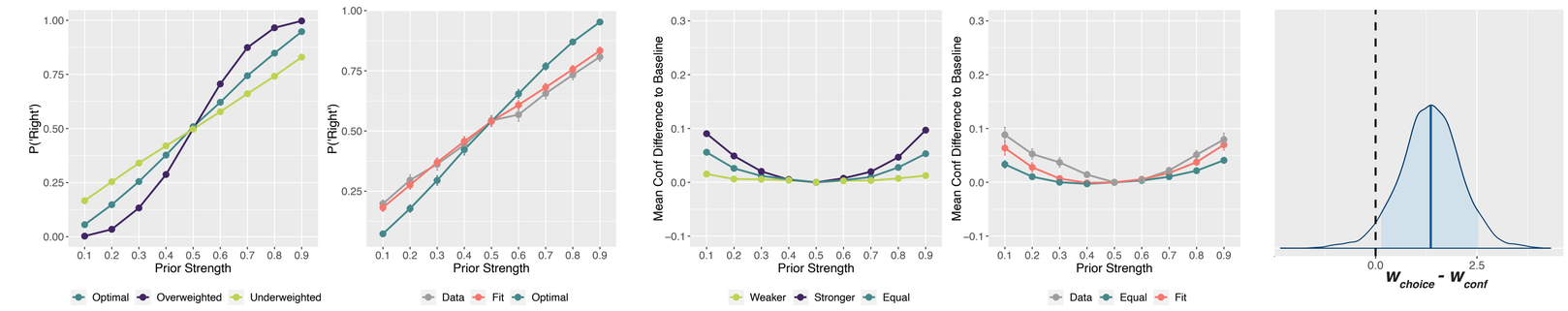
Paradigm



- Added delay so target decision at time of confidence in Exp. 1

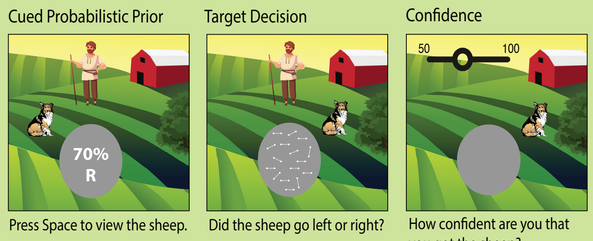
2

... Even With Exogenously Cued Priors



Results
- $w_{choice} > 1$
- $w_{conf} < w_{choice}$

Paradigm



- Single Decisions + Confidence
- Priors - 0.5, 0.6, 0.7, 0.8, 0.9 L/R

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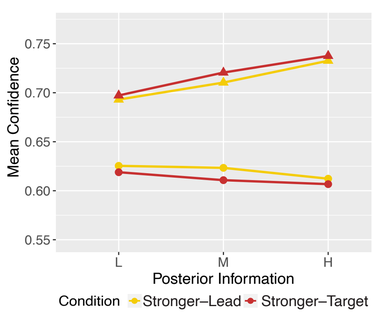
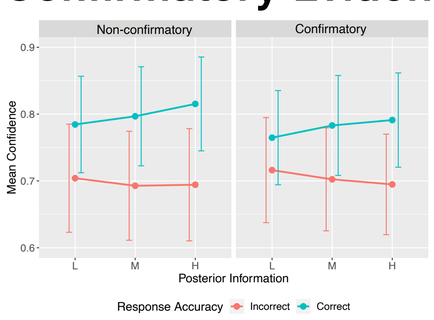
Exploring Alternative Explanations

Confidence Leak



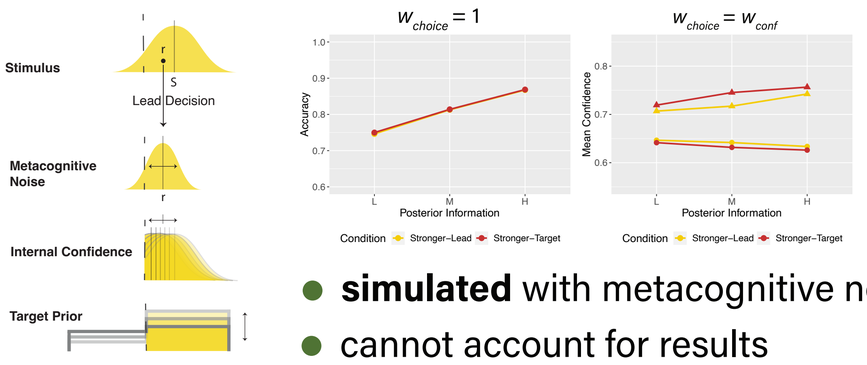
- **simulated** with $w_{choice} = w_{conf}$
- cannot capture conf data

Confidence Bias



- **data** split by confirmatory choices or not
- conf not higher for confirmatory choices

Metacognitive Noise



- **simulated** with metacognitive noise
- cannot account for results

Discussion

- Even when prior information is dismissed at the level of decisions, it is monitored and used to a greater extent at the metacognitive level
- This is not due to differences in processing time, or the nature of the dual-decision task
- Shows importance of the metacognitive level when understanding priors, and the importance of informative priors to precisely model Bayesian confidence

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