

Lapses in perceptual decisions reflect exploration(2021)

<https://elifesciences.org/articles/55490.pdf>

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Research Question

Is there any comprehensive and normative explanation for “lapses” or they should be regarded as a nuisance?

Hypothesis

- lapses reflect a strategic trade-off between exploiting known rewarding actions and exploring uncertain ones.
- Probability of lapses are reduced on multisensory trials.
- If we selectively manipulating one action’s reward magnitude or probability, lapses should be restricted to those associated with that action.
- Lapses should be affected by perturbations to brain regions that encode action value.
- Exp1: Multisensory decision-making task in rodents.
- Exp2: Manipulating expected rewards associated with one of the stimulus categories.
- Exp3: same as experiment 2 with perturbation of secondary motor cortex (M2) or posterior striatum (pStr).

Experiment

Novelty

A new explanation for Lapses in perceptual decision making.

Result

- More lapses on conditions with higher perceptual uncertainty, unisensory or neutral compared to matched multisensory or sure-bet conditions.
- Stimulus-specific reward manipulations produce stimulus-specific effects on lapses.
- Lapses are affected by perturbations to brain regions that encode action value.

Look at below paper where authors observed a performance better than ideal observer.
I think the proposed model can well explain this behavior:

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