

Understanding the Default Mode Network's Computational Role in Decision-Making

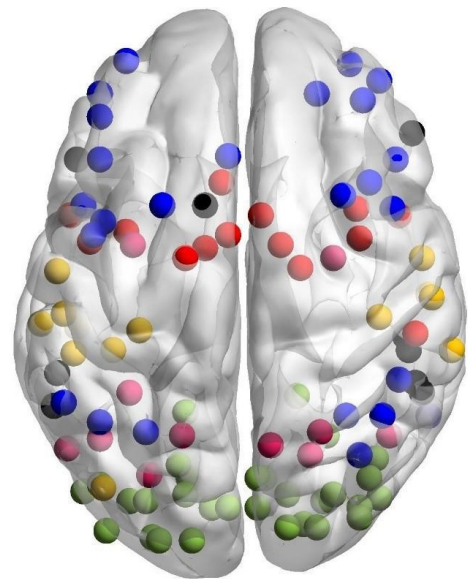
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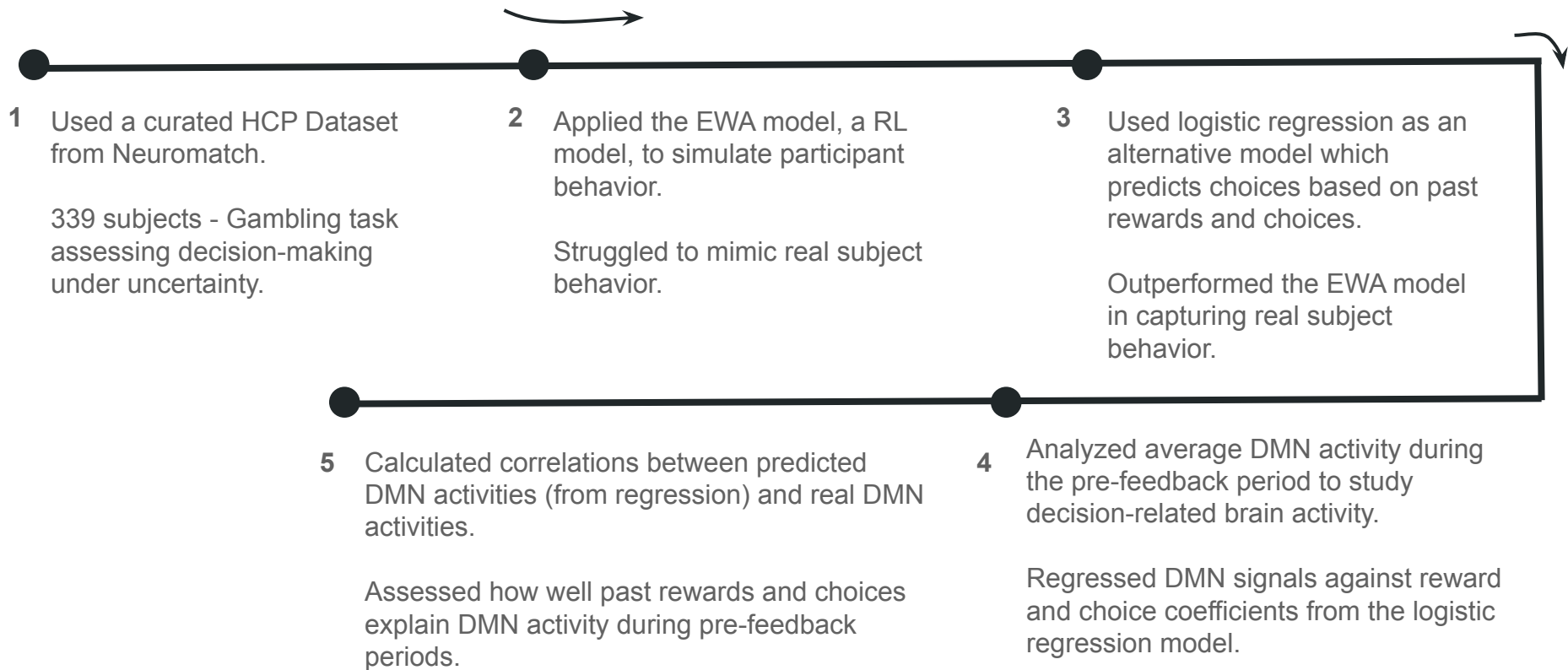
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Background

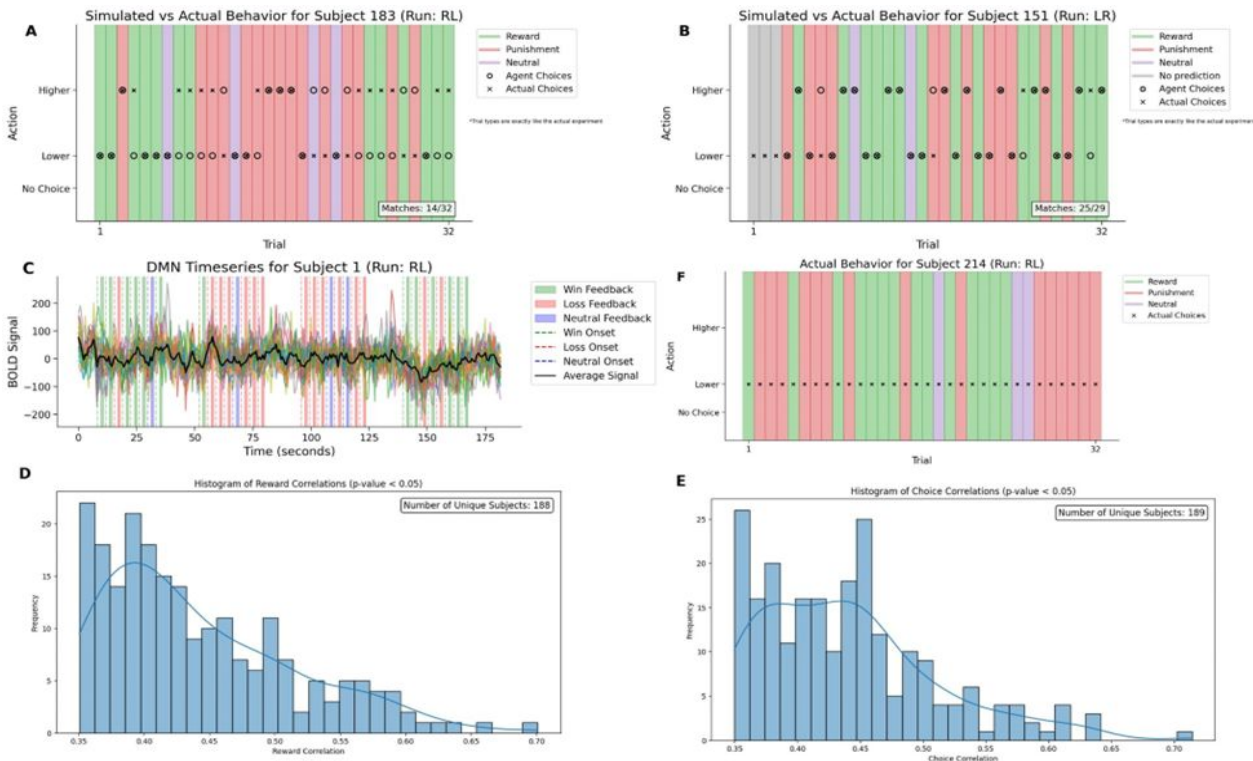
- The decisions we make are often under uncertainty and risks, therefore, understanding the neurobiological basis of these decisions is a key challenge in cognitive neuroscience.
- Our previous study investigated the role of the DMN in risky decision-making. In the present study, we aim to build on these findings by exploring how individuals make decisions based on their past experiences.
- Reinforcement learning (RL) models provide a framework for understanding how individuals learn from past rewards and choices to guide future behavior.



Methods



Results



A. The EWA model struggled to accurately capture the real subject's response patterns, so failed to mimic the subject's decision-making.

B. The logistic regression model shows a better ability to simulate the subject's choices.

C. The activity from multiple regions within the DMN, along with the average DMN signal across all parcels during the pre-feedback periods.

D, E. Positive correlations between DMN activity and feedback/choices Potential role of the DMN in processing outcome-related information.

F. Repetitive choice pattern by one of the subjects.

Limitations & Future Direction

Limitations

- The HCP gambling task may not induce meaningful decision-making due to repetitive choice patterns.
- Use of average DMN signal, potentially overlooking distinct regional contributions.
- Small number of trials, makes it difficult for the models to capture beha

Future Direction

- Future research could examine each region separately to refine our understanding and improve the model accuracy.
- Utilize Probabilistic reversal learning tasks to better capture the adaptive decision-making processes.
- Develop more refined models to better account for the dynamic changes in decision-making observed in tasks like probabilistic reversal learning.

Meet Our Team



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