

Older Adults Demonstrate Greater Model-based Decision-making when Task Demands are Reduced

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Introduction

Younger adults' decision-making behavior is often a combination of model-free (MF) and model-based (MB) decision strategies [1,2]. In contrast, older adults seem to rely primarily on MF strategies due to their deficit in representing the task structure which is necessary for MB decision-making [3,4,5].

The aims of the current study were twofold: first, we aimed to examine if the degree of MB decision-making in older adults is sensitive to changes in demands on representing the transition structure; second, we investigated the neural dynamics underlying age-related shifts in decision strategies.

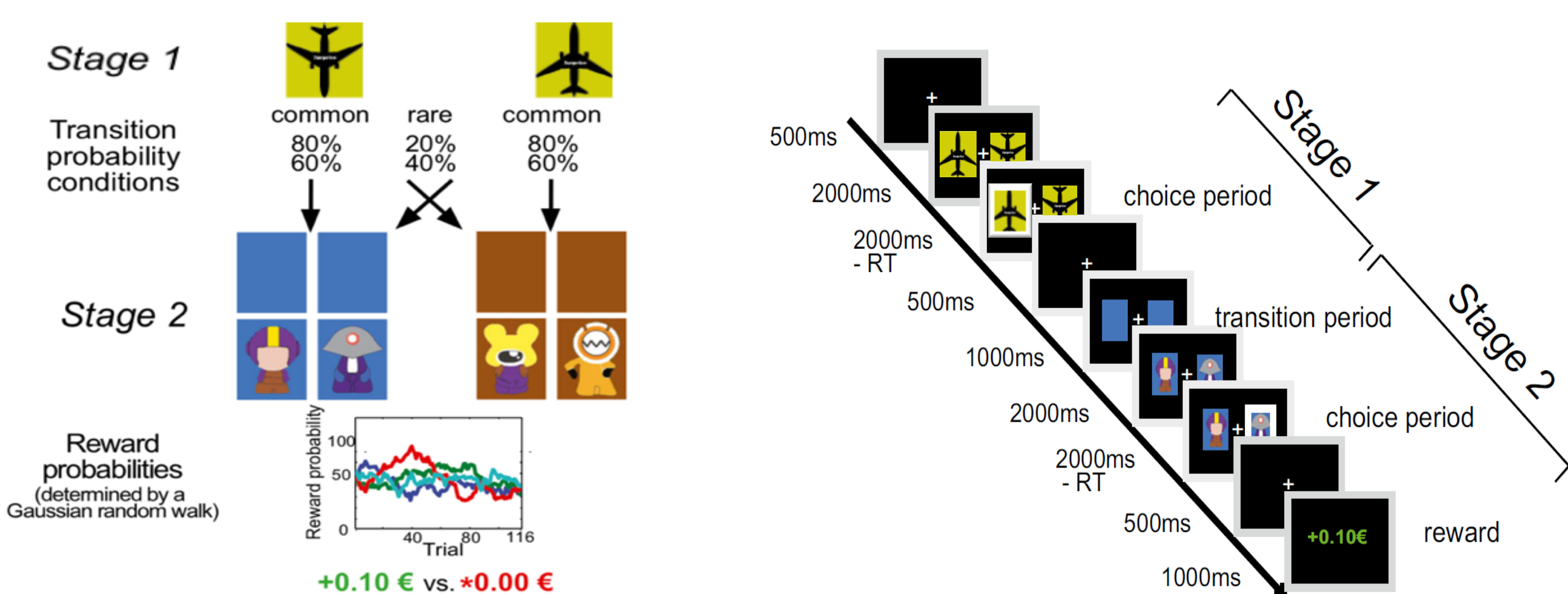


Figure 1. (A) Schematic representation of the modified two-stage Markov decision task. (B) Trial procedure of the two-stage task.

Behavioral Results

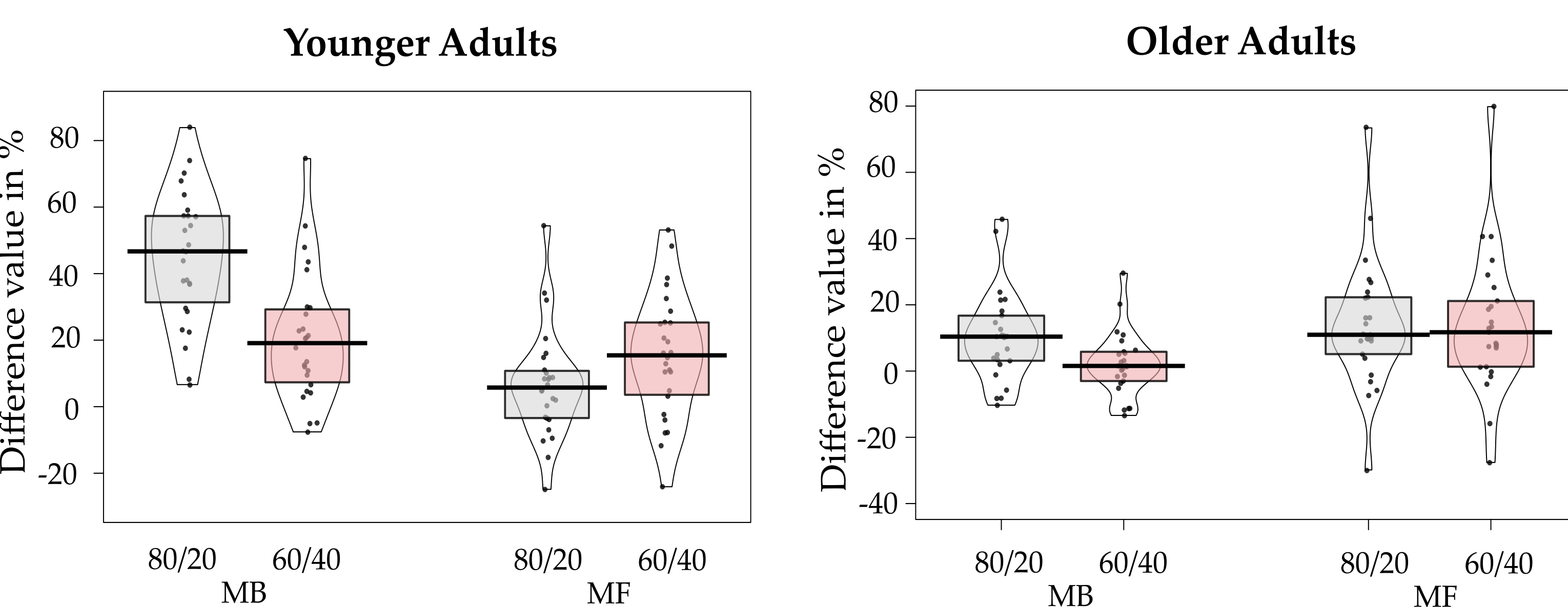


Figure 2. Difference values (stay probabilities) for model-based behavior ((common reward + rare no reward) - (rare reward + common no reward)) and model-free behavior ((common reward + rare reward) - (common no reward + rare no reward)).

EEG Results

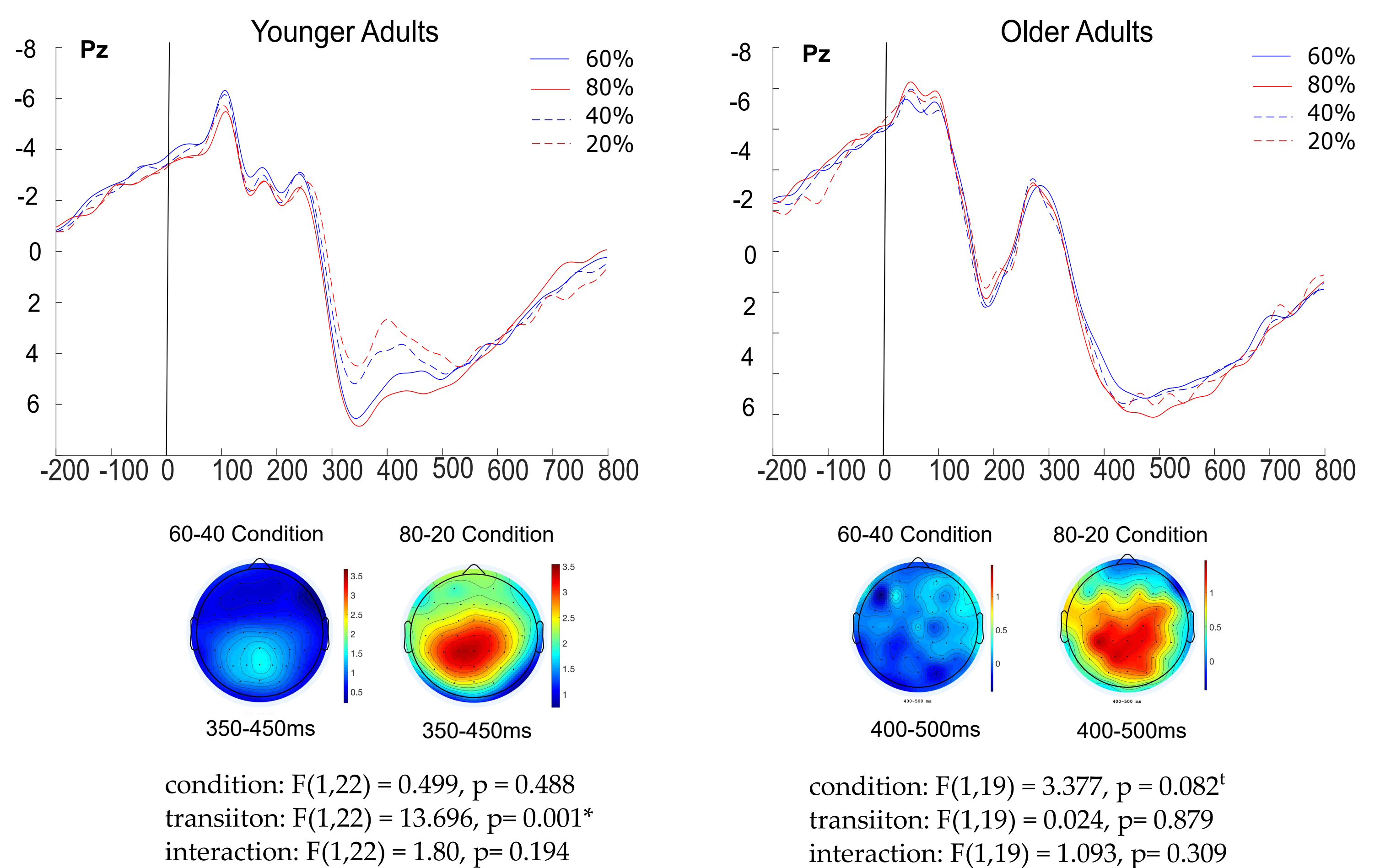


Figure 3. Top: ERPs elicited by second-stage stimuli at electrode Pz. Bottom: The topographical displays of the difference between common and rare transitions.

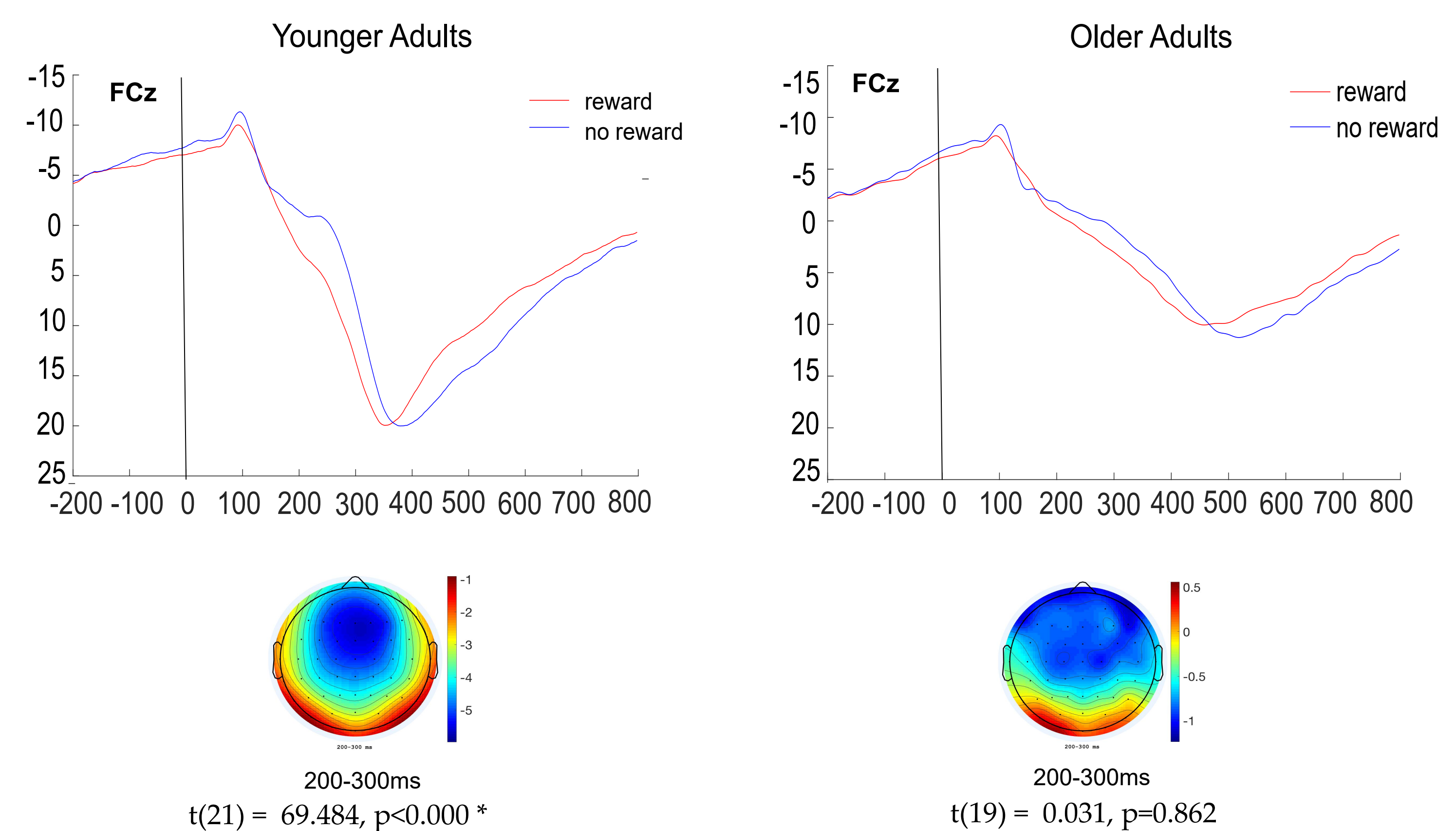


Figure 4. Top: Feedback locked ERPs at electrode FCz for rewards and no rewards. Bottom: The topographical map displays of the difference between no reward and reward feedback.

Conclusion

Our results suggest that both younger and older adults show enhanced model-based decision-making when the demands on the representation of the state transition structure is low (80-20 condition) compared to when they are high (60-40 condition). However, this effect is much more pronounced in younger adults.

References

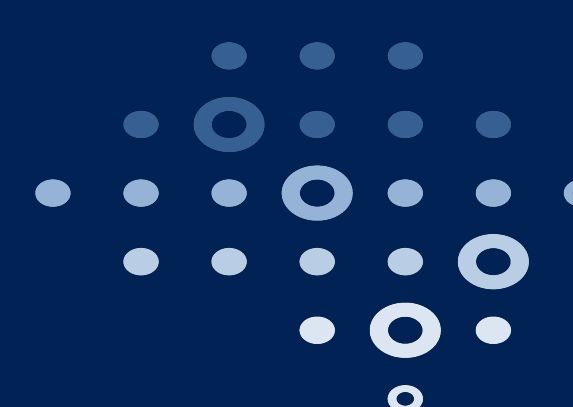
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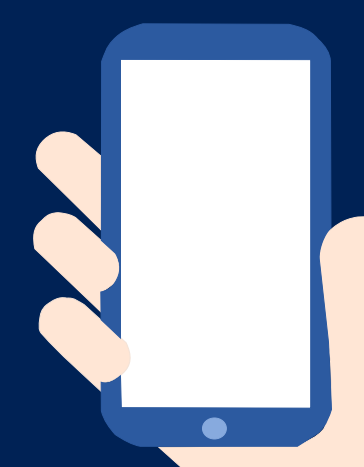
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