



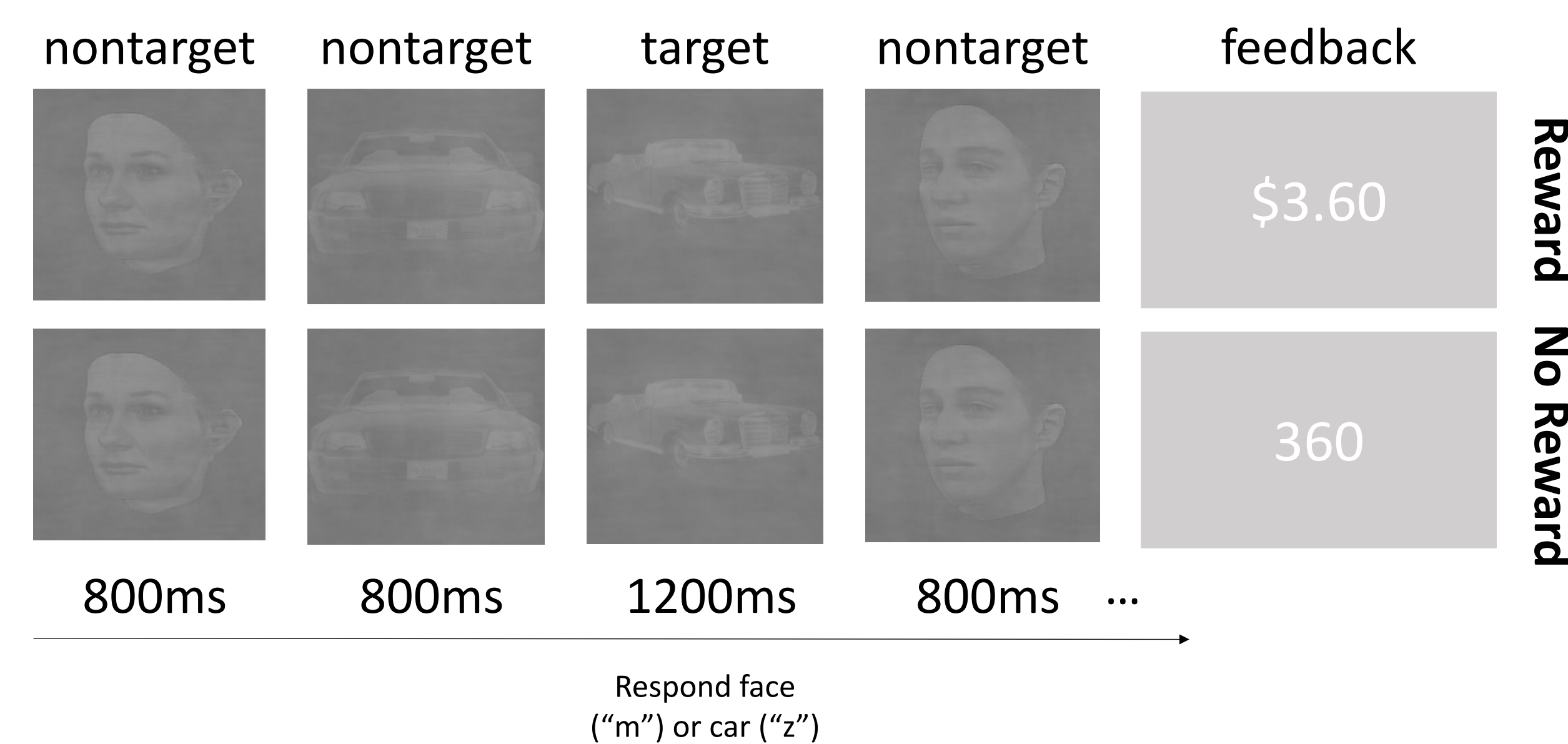
### Introduction

- Performance declines across time in vigilance tasks at least partly due to attentional lapses
- Overload theories of the vigilance decrement predict reward has no effect on performance whereas underload theories predict an improvement in performance.
- We investigated the impact of reward on performance during a sustained attention task using EEG alpha oscillations as an indicator for attentional lapses

### Method

#### Continuous Temporal Expectancy Task (CTET)

- Images of faces and cars presented sequentially
- Respond only when a long duration image (90% trials) is presented



#### Feedback Structure

Correct Hit: +10 Miss: -10 False Alarm: -1

#### Analysis

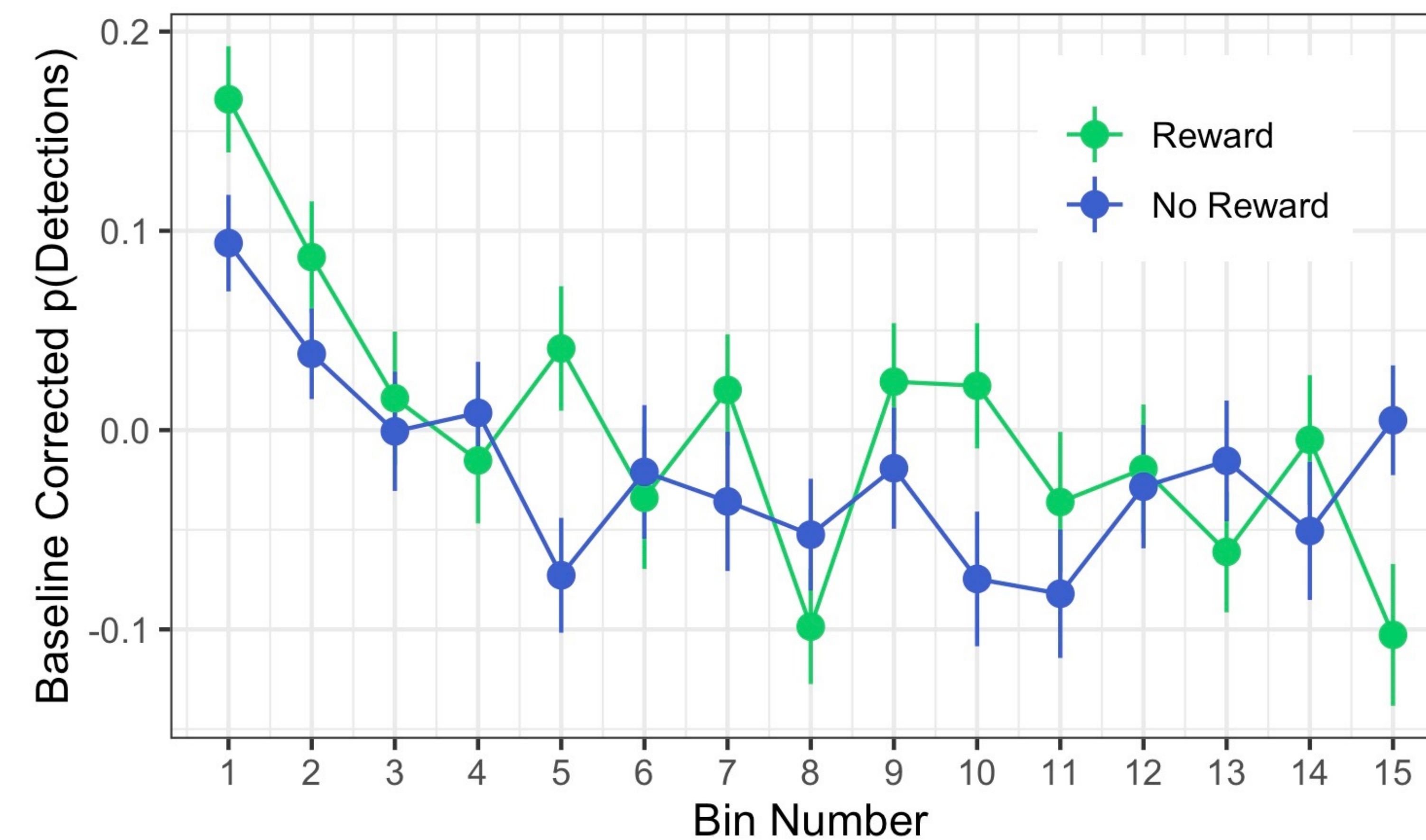
##### Behavior

- n = 8 (reward) n = 9 (no reward), between subjects
- 2000ms response window
- 360 trials/block; 10 ~5 min block
- 15 bins of 24 trials (~20 sec/bin)
- Baseline adjusted by subject's practice block

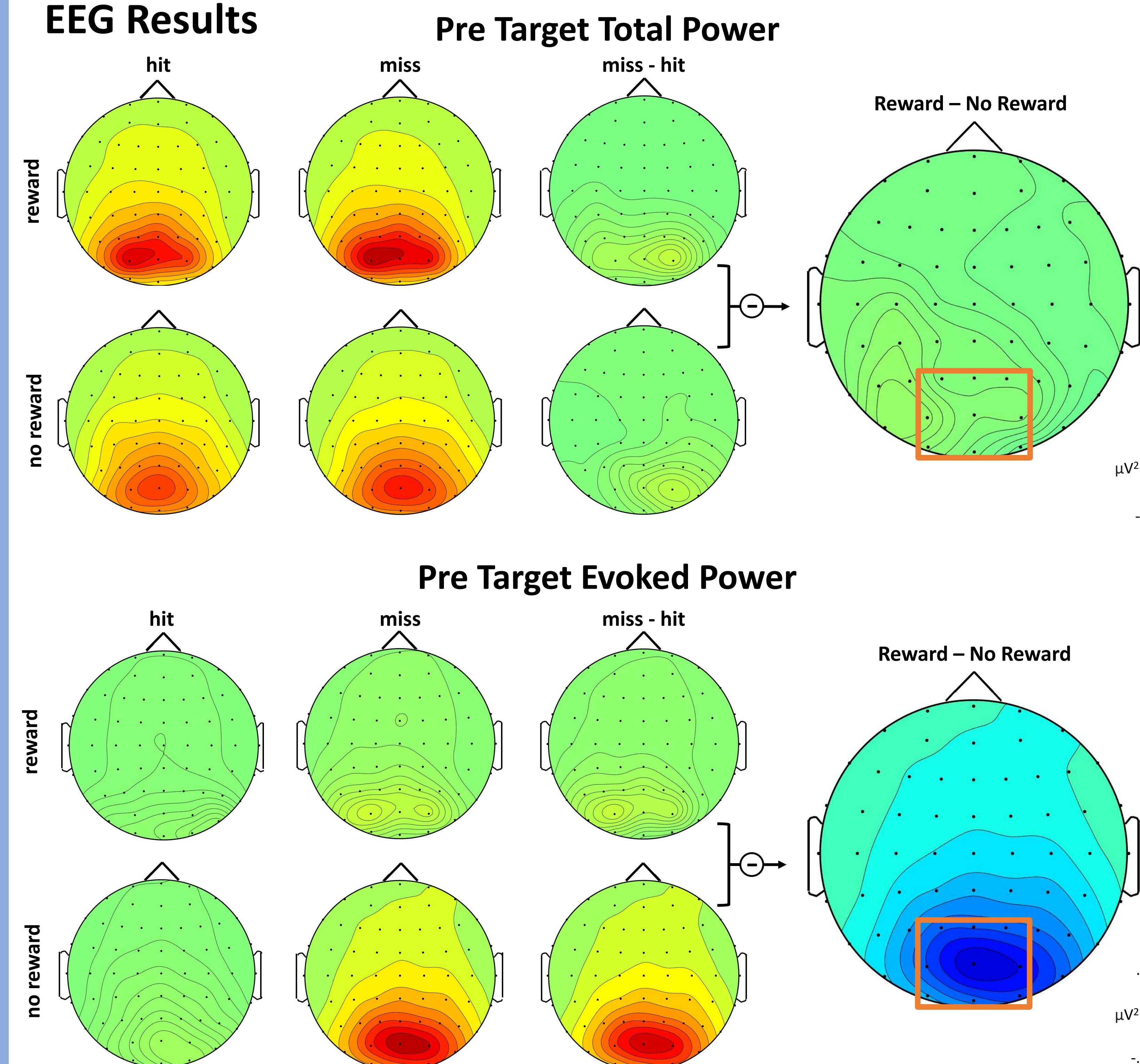
##### EEG

- Fast Fourier Transform 8-12 Hz Alpha
- Epoch [-4000ms,800ms] around target stimulus onset
- Statistical analysis on 9 posterior electrodes (orange box)

### Behavioral Results



### EEG Results



### Total Power



### Evoked Power



### Summary

#### Behavior

- The vigilance decrement persisted in both groups
- Reward does not alleviate the vigilance decrement
- Ceiling effects may attenuate the effect of reward
- High variability in task performance demands higher n

#### EEG

- Greater for pretarget miss-hit for total and evoked\* alpha
- Greater miss-hit difference\* for no reward group
- May reflect phase dependent influence of alpha on sustained attention
- Phase dependency may vary depending on levels of motivation

### Conclusion

The relationship between alpha and lapses of attention is impacted by monetary reward, possibly due to phase specific information.

### Acknowledgements

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